SEQUENCE LISTING

```
<110> Stocker, Penny J.
      Steimel-Crespi, Dorothy T.
      Crespi, Charles L.
      Rief, Timothy  C
      Patten, Christopher J.

<120> P-GLYCOPROTEINS AND USES THEREOF

<130> G0307/7017

<150> US 60/156,510
<151> 1999-09-28

<160> 32

<170> FastSEQ for Windows Version 3.0

<210> 1
<211> 4279
<212> DNA
<213> Canis familiaris

<220>
<221> CDS
<222> (17)...(3859)

<400> 1
ggagcgcgag gtcggg atg gat cct gaa gga ggc cgt aag ggg agt gca gag      52
               Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu
                1               5                   10

aag aac ttc tgg aaa atg ggc aaa aaa agt aaa aaa aat gag aag aaa      100
Lys Asn Phe Trp Lys Met Gly Lys Lys Ser Lys Lys Asn Glu Lys Lys
     15              20                  25

gaa aag aaa cca act gtc agc acg ttt gca atg ttt cgc tat tca aat      148
Glu Lys Lys Pro Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn
 30              35                  40

tgg ctt gat agg ttg tat atg ttg gtg ggg aca atg gct gcc atc atc      196
Trp Leu Asp Arg Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile
45              50                  55                  60

cat gga gct gca ctc cct ctc atg atg ctg gtt ttt gga aac atg aca      244
His Gly Ala Ala Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr
                65                  70                  75

gat agc ttt gca aat gca gga att tca aga aac aaa act ttt cca gtt      292
Asp Ser Phe Ala Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val
                80                  85                  90

ata att aat gaa agt att acg aac aat aca caa cat ttc atc aac cat      340
Ile Ile Asn Glu Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His
             95                  100                 105

ctg gag gag gaa atg acc acg tat gcc tat tat tac agt ggg atc ggt      388
```

```
          Leu Glu Glu Glu Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly
              110             115             120

       5  gct ggc gtg ctg gtg gct gct tac atc cag gtt tca ttc tgg tgc ctg    436
          Ala Gly Val Leu Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu
              125             130             135             140

      10  gca gca gga aga cag ata ctc aaa att aga aaa caa ttt ttt cat gct    484
          Ala Ala Gly Arg Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala
                          145             150             155

          atc atg cga cag gag att ggc tgg ttt gac gtg cat gac gtt ggg gag    532
          Ile Met Arg Gln Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu
                      160             165             170
      15
          ctt aac acc cgg ctc aca gac gat gtc tcc aaa atc aat gaa gga att    580
          Leu Asn Thr Arg Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile
                      175             180             185

      20  ggc gac aaa att gga atg ttc ttt cac tca ata gca aca ttt ttc acc    628
          Gly Asp Lys Ile Gly Met Phe Phe His Ser Ile Ala Thr Phe Phe Thr
                  190             195             200

          ggt ttt ata gtg ggg ttt aca cgt ggt tgg aag cta acc ctt gtg att    676
      25  Gly Phe Ile Val Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile
          205             210             215             220

          ttg gcc atc agc cct gtt ctt gga ctt tca gcc gcc atc tgg gca aag    724
          Leu Ala Ile Ser Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys
      30                  225             230             235

          ata cta tct tca ttt act gat aaa gaa ctc ttg gcc tat gca aaa gct    772
          Ile Leu Ser Ser Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala
                          240             245             250
      35
          gga gca gta gct gaa gaa gtc tta gca gca atc aga act gtg att gcc    820
          Gly Ala Val Ala Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala
                  255             260             265

      40  ttt gga gga caa aag aaa gaa ctt gaa agg tac aac aaa aat tta gaa    868
          Phe Gly Gly Gln Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu
                  270             275             280

          gaa gct aaa gga att ggg ata aag aaa gct atc acg gcc aac att tct    916
      45  Glu Ala Lys Gly Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser
          285             290             295             300

          att ggt gcc gct ttc tta ttg atc tat gca tca tat gct ctg gct ttc    964
          Ile Gly Ala Ala Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe
      50                  305             310             315

          tgg tat ggg acc tcc ttg gtc ctc tcc agt gaa tat tct att gga caa   1012
          Trp Tyr Gly Thr Ser Leu Val Leu Ser Ser Glu Tyr Ser Ile Gly Gln
                      320             325             330
      55
          gta ctc act gtc ttc ttt tct gta tta att ggg gct ttt agt att gga   1060
          Val Leu Thr Val Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly
                      335             340             345

      60  cag gca tcc cca agc att gaa gca ttt gca aac gca aga gga gca gct   1108
```

```
                Gln Ala Ser Pro Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala
                350             355             360

     5    tat gaa atc ttc aag ata att gac aat aaa cca agc att gac agc tat      1156
          Tyr Glu Ile Phe Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr
          365             370             375             380

    10    tcg aag agt gga cat aaa cca gat aat att aag gga aat ttg gaa ttc      1204
          Ser Lys Ser Gly His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe
                        385             390             395

    15    aaa aat gtt cac ttc agt tac cct tct cga aaa gaa gtt aag atc tta      1252
          Lys Asn Val His Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu
                        400             405             410

    20    aag ggt ctc aac ctg aag gtt cag agt ggg cag aca gtg gcg ctg gtt      1300
          Lys Gly Leu Asn Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val
                        415             420             425

          ggg aac agt ggc tgc ggg aag agc acg acc gtg cag ctg atg cag agg      1348
          Gly Asn Ser Gly Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg
                430             435             440

    25    ctc tat gac ccc aca gat ggc atg gtc tgt att gat gga cag gac att      1396
          Leu Tyr Asp Pro Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile
          445             450             455             460

    30    agg acc ata aat gta agg cat ctt cgg gaa att act ggt gtg gtg agt      1444
          Arg Thr Ile Asn Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser
                        465             470             475

    35    cag gag cct gtg ttg ttt gcc acc acg ata gct gaa aac att cgc tat      1492
          Gln Glu Pro Val Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr
                        480             485             490

          ggc cgc gaa aat gtc acc atg gat gag att gag aaa gct gtt aag gaa      1540
          Gly Arg Glu Asn Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu
                495             500             505

    40    gcc aat gcc tat gat ttt atc atg aaa cta cct aat aaa ttt gac act      1588
          Ala Asn Ala Tyr Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr
                510             515             520

    45    ctg gtt gga gag aga ggg gcc cag ctg agt ggt gga cag aaa cag aga      1636
          Leu Val Gly Glu Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg
          525             530             535             540

    50    atc gcc att gct cgg gcc ctg gtt cgc aac ccc aag att ctt ctg ctg      1684
          Ile Ala Ile Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu
                        545             550             555

    55    gat gag gca acg tca gct ctg gac act gaa agt gaa gca gtg gtt cag      1732
          Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln
                560             565             570

          gtg gcc ctg gat aag gcc aga aaa ggc cgg act acc att gtg ata gct      1780
          Val Ala Leu Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala
                575             580             585

    60    cat cgt ttg tct aca gtt cgt aat gcc gat gtc att gct ggt ttt gat      1828
```

```
        His Arg Leu Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp
            590                 595                 600

    5   gat gga gtc att gtg gag aaa gga aat cat gat gaa ctc atg aaa gag    1876
        Asp Gly Val Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu
        605                 610                 615                 620

   10   aag ggc att tac ttc aaa ctt gtc aca atg cag aca aga gga aat gaa    1924
        Lys Gly Ile Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu
                        625                 630                 635

        att gag tta gaa aat gcc act ggt gaa tcc aaa agt gaa agt gat gcc    1972
        Ile Glu Leu Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala
                            640                 645                 650
   15
        ttg gaa atg tct cca aaa gat tca ggg tcc agt tta ata aaa aga aga    2020
        Leu Glu Met Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg
                        655                 660                 665

   20   tca act cgc agg agt ata cat gca cca caa ggc caa gac aga aag ctt    2068
        Ser Thr Arg Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu
                670                 675                 680

        ggt aca aaa gag gac ttg aat gag aat gta cct cca gtt tcc ttc tgg    2116
   25   Gly Thr Lys Glu Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp
        685                 690                 695                 700

        agg att ctg aag ctg aac tca act gaa tgg cct tat ttt gtg gtt ggt    2164
        Arg Ile Leu Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly
   30                   705                 710                 715

        ata ttt tgt gct att ata aac gga ggc ctg caa cca gca ttt tca ata    2212
        Ile Phe Cys Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile
                        720                 725                 730
   35
        ata ttt tca agg att ata ggg atc ttt acc cga gat gag gat cct gaa    2260
        Ile Phe Ser Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu
                735                 740                 745

   40   aca aaa cga cag aat agt aac atg ttt tct gta ttg ttt cta gtc ctt    2308
        Thr Lys Arg Gln Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu
                750                 755                 760

        gga att att tct ttt att aca ttt ttc ctc cag ggc ttc aca ttt ggc    2356
   45   Gly Ile Ile Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly
        765                 770                 775                 780

        aaa gct ggg gag atc ctc act aag cgg ctt cga tac atg gtt ttc aga    2404
        Lys Ala Gly Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg
   50                   785                 790                 795

        tcc atg ctg aga cag gat gtc agc tgg ttt gat gac cct aaa aac acc    2452
        Ser Met Leu Arg Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr
                        800                 805                 810
   55
        act gga gca ttg aca acc agg ctt gcc aat gat gcg gct caa gtt aaa    2500
        Thr Gly Ala Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys
                815                 820                 825

   60   ggg gct ata ggt tcc agg ctt gct gtc att acc cag aat ata gca aat    2548
```

```
            Gly Ala Ile Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn
                830                     835                 840

5           ctt ggg aca ggc att att ata tcc tta atc tat ggt tgg caa tta aca    2596
            Leu Gly Thr Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr
                845                     850             855                 860

10          ctt tta ctc tta gca att gta ccc atc att gca ata gca gga gtt gtt    2644
            Leu Leu Leu Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val
                            865             870                 875

            gaa atg aaa atg ttg tct gga caa gca ctg aaa gat aag aaa gag cta    2692
            Glu Met Lys Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu
15                          880                 885                 890

            gaa gga gct ggg aag att gct aca gaa gcc atc gaa aac ttc cga act    2740
            Glu Gly Ala Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr
                            895                 900             905

20          gtt gtt tct ttg act cgg gag cag aag ttt gaa tac atg tat gca cag    2788
            Val Val Ser Leu Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln
                910                     915             920

25          agt ttg caa gta cca tac aga aac tct ttg agg aaa gca cac atc ttc    2836
            Ser Leu Gln Val Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe
                925                     930             935                 940

            ggg gtc tca ttt tct atc acc cag gca atg atg tat ttt tcc tat gct    2884
30          Gly Val Ser Phe Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala
                            945                 950                 955

            ggc tgt ttc cgg ttt ggt gcc tac ttg gtg gca aat gag ttc atg aac    2932
            Gly Cys Phe Arg Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn
35                          960                 965                 970

            ttt cag gat gtt ctt ttg gta ttc tca gct att gtc ttt ggt gcc atg    2980
            Phe Gln Asp Val Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met
                            975                 980                 985

40          gca gtg ggg cag gtc agt tca ttt gct cct gac tat gcc aaa gcc aaa    3028
            Ala Val Gly Gln Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys
                990                     995                 1000

45          gta tca gca gcc cac gtc atc atg atc att gaa aaa agc cct ctg att    3076
            Val Ser Ala Ala His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile
            1005                    1010                1015                1020

            gac agc tac agc cct cac ggc ctc aag cca aat acg ttg gaa gga aat    3124
50          Asp Ser Tyr Ser Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn
                            1025                1030                1035

            gtg aca ttt aat gag gtc gtg ttc aac tat ccc act cga cca gac atc    3172
            Val Thr Phe Asn Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile
55                          1040                1045                1050

            ccc gtg ctc cag ggg ctg agc ctc gag gtg aag aag ggc cag acg ctg    3220
            Pro Val Leu Gln Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu
                1055                    1060                1065

60          gcc ctc gta ggt agc agt ggc tgt ggg aag agc aca gtt gtt cag ctc    3268
```

```
        Ala Leu Val Gly Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu
            1070                1075                1080
```

```
   5    cta gag cgc ttc tat gac ccc ttg gct ggt tca gtg cta att gat ggc    3316
        Leu Glu Arg Phe Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly
            1085                1090                1095                1100
```

```
  10    aaa gag ata aag cac ctg aat gtc cag tgg ctc cga gca cac ctg ggc    3364
        Lys Glu Ile Lys His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly
            1105                1110                1115
```

```
        atc gtg tct cag gag ccc atc ctg ttt gac tgc agc att gcc gag aac    3412
        Ile Val Ser Gln Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn
  15        1120                1125                1130
```

```
        att gcc tat gga gac aac agc cgg gtc gta tca cat gaa gag att atg    3460
        Ile Ala Tyr Gly Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Met
            1135                1140                1145
```

```
  20    cag gca gcc aag gag gcc aac ata cac cac ttc atc gag aca ctc cct    3508
        Gln Ala Ala Lys Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro
            1150                1155                1160
```

```
  25    gag aaa tac aac acc aga gta gga gac aaa gga acc cag ctc tct ggt    3556
        Glu Lys Tyr Asn Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly
            1165                1170                1175                1180
```

```
        ggc cag aaa cag cgc att gcc ata gct cgc gct ctt gtt aga cag cct    3604
        Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro
  30        1185                1190                1195
```

```
        cat att ttg ctt ttg gat gaa gct aca tca gct ctg gat aca gaa agt    3652
        His Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser
            1200                1205                1210
  35
```

```
        gaa aag gtt gtc caa gaa gcc ctg gac aaa gcc aga gaa ggc cgc acc    3700
        Glu Lys Val Val Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr
            1215                1220                1225
```

```
  40    tgc att gtg atc gcc cac cgc ttg tcc acc atc cag aat gca gat tta    3748
        Cys Ile Val Ile Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu
            1230                1235                1240
```

```
  45    ata gtg gtg ttt cag aat ggc aaa gtc aag gag cat ggc aca cat caa    3796
        Ile Val Val Phe Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln
            1245                1250                1255                1260
```

```
        cag ctg ctg gcc cag aaa ggc atc tat ttt tcc atg gtc agt gtc cag    3844
        Gln Leu Leu Ala Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln
  50        1265                1270                1275
```

```
        gct gga gca aag cgc tagtgaactg tggccatatg agctgttaaa tatttttaa    3899
        Ala Gly Ala Lys Arg
            1280
  55
```

```
        tatttgtgtt aaaacatggc atttaatcaa agttaaaagg tgagcactta ctggaaaaac    3959
        tatgtagaac tacctgttta acatttcttg ctgcaactga agatcattcc accaagttca    4019
        gagtcttcag attttataat taaaggaacc aaaagaaaca ttatctgatg gaataaaata    4079
        ctggtgttaa ttgcattata aaattataga gtaattcaaa gtagattttg ttaataaatt    4139
  60    gtataatttt tgtttatatt ttatttgtaa cttactgctt tgctgaaaga ttatagaagt    4199
```

ggtaaaaagt actgaatgtt tgaataaagt gctagctata ataaaactaa acttttatat   4259
caaaaaaaaa aaaaaaaaaa

<210> 2
<211> 1281
<212> PRT
<213> Canis familiaris

<400> 2

Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu Lys Asn Phe Trp
1   5   10   15

Lys Met Gly Lys Lys Ser Lys Lys Asn Glu Lys Lys Glu Lys Lys Pro
                20   25   30

Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn Trp Leu Asp Arg
            35   40   45

Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile His Gly Ala Ala
    50   55   60

Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr Asp Ser Phe Ala
65   70   75   80

Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val Ile Ile Asn Glu
                85   90   95

Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His Leu Glu Glu Glu
            100   105   110

Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu
        115   120   125

Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg
    130   135   140

Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln
145   150   155   160

Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg
                165   170   175

Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Ile
            180   185   190

Gly Met Phe Phe His Ser Ile Ala Thr Phe Phe Thr Gly Phe Ile Val
        195   200   205

Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser
    210   215   220

Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys Ile Leu Ser Ser
225   230   235   240

Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala
                245   250   255

Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln
            260   265   270

Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Gly
        275   280   285

Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala
    290   295   300

Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr
305   310   315   320

Ser Leu Val Leu Ser Ser Glu Tyr Ser Ile Gly Gln Val Leu Thr Val
                325   330   335

Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly Gln Ala Ser Pro
            340   345   350

Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe
        355   360   365

Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly
    370   375   380

His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Lys Asn Val His
385   390   395   400

Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn

```
                    405                     410                        415
    Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly
                        420               425                   430
    Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro
5                   435               440               445
    Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile Arg Thr Ile Asn
        450               455               460
    Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser Gln Glu Pro Val
    465               470               475                   480
10  Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn
                    485               490               495
    Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr
                500               505               510
    Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr Leu Val Gly Glu
15          515               520               525
    Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala
        530               535               540
    Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr
    545               550               555                   560
20  Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp
                565               570               575
    Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser
                580               585               590
    Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile
25          595               600               605
    Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr
        610                   615               620
    Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Glu Leu Glu
    625               630               635                   640
30  Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met Ser
                645               650               655
    Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg Arg
                660               665               670
    Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys Glu
35          675               680               685
    Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp Arg Ile Leu Lys
        690               695               700
    Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys Ala
    705               710               715                   720
40  Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser Arg
                725               730               735
    Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg Gln
                740               745               750
    Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile Ser
45          755               760               765
    Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu
        770               775               780
    Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg
    785               790               795                   800
50  Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu
                805               810               815
    Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly
                820               825               830
    Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly
55          835               840               845
    Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu
        850               855               860
    Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met
    865               870               875                   880
60  Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly
```

```
                    885                        890                            895
        Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu
                        900                        905                        910
        Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln Ser Leu Gln Val
   5                    915                        920                        925
        Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Val Ser Phe
                    930                        935                        940
        Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg
        945                        950                        955                        960
  10    Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn Phe Gln Asp Val
                        965                        970                        975
        Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met Ala Val Gly Gln
                    980                        985                        990
        Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala
  15                    995                        1000                        1005
        His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile Asp Ser Tyr Ser
            1010                        1015                        1020
        Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn
        1025                        1030                        1035                        104
  20    Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln
                        1045                        1050                        1055
        Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly
                    1060                        1065                        1070
        Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe
  25                    1075                        1080                        1085
        Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly Lys Glu Ile Lys
            1090                        1095                        1100
        His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln
        1105                        1110                        1115                        1120
  30    Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly
                        1125                        1130                        1135
        Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Met Gln Ala Ala Lys
                    1140                        1145                        1150
        Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro Glu Lys Tyr Asn
  35        1155                        1160                        1165
        Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln
            1170                        1175                        1180
        Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu
        1185                        1190                        1195                        1200
  40    Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val
                        1205                        1210                        1215
        Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile
                    1220                        1225                        1230
        Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe
  45        1235                        1240                        1245
        Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala
            1250                        1255                        1260
        Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Ala Lys
        1265                        1270                        1275                        1280
  50    Arg
```

```
        <210> 3
        <211> 4317
  55    <212> DNA
        <213> Canis familiaris

        <220>
        <221> CDS
  60    <222> (70)...(3912)
```

<400> 3

```
ctaagtcgga gtatcttctt cccaaattcc cttctcggtg gaggttgcga aggaaagccc      60
gaggtgacg atg gat cct gaa gga ggc cgt aag ggg agt gca gag aag aac     111
          Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu Lys Asn
           1               5                   10

ttc tgg aaa atg ggc aaa aaa agt aaa aaa gag aag aaa gaa aag aaa        159
Phe Trp Lys Met Gly Lys Lys Ser Lys Lys Glu Lys Lys Glu Lys Lys
 15               20                  25                  30

cca act gtc agc acg ttt gca atg ttt cgc tat tca aat tgg ctt gat       207
Pro Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn Trp Leu Asp
                 35                  40                  45

agg ttg tat atg ttg gtg ggg aca atg gct gcc atc atc cat gga gct       255
Arg Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile His Gly Ala
             50                  55                  60

gca ctc cct ctc atg atg ctg gtt ttt gga aac atg aca gat agc ttt       303
Ala Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr Asp Ser Phe
         65                  70                  75

gca aat gca gga att tca aga aac aaa act ttt cca gtt ata att aat       351
Ala Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val Ile Ile Asn
     80                  85                  90

gaa agt att acg aac aat aca caa cat ttc atc aac cat ctg gag gag       399
Glu Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His Leu Glu Glu
 95                  100                 105                 110

gaa atg acc acg tat gcc tat tat tac agt ggg atc ggt gct ggc gtg       447
Glu Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val
                 115                 120                 125

ctg gtg gct gct tac atc cag gtt tca ttc tgg tgc ctg gca gca gga       495
Leu Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly
             130                 135                 140

aga cag ata ctc aaa att aga aaa caa ttt ttt cat gct atc atg cga       543
Arg Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg
         145                 150                 155

cag gag att ggc tgg ttt gac gtg cat gac gtt ggg gag ctt aac acc       591
Gln Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr
     160                 165                 170

cgg ctc aca gac gat gtc tcc aaa atc aat gaa gga att ggc gac aaa       639
Arg Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys
 175                 180                 185                 190

gtt gga atg ttc ttt caa tca ata gca aca ttt ttc acc ggt ttt ata       687
Val Gly Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr Gly Phe Ile
                 195                 200                 205

gtg ggg ttt aca cct ggt tgg aag cta acc ctt gtg att ttg gcc atc       735
Val Gly Phe Thr Pro Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile
             210                 215                 220

agc cct gtt ctt gga ctt tca gcc gcc atc tgg gca aag ata cta tct       783
```

```
            Ser Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys Ile Leu Ser
                    225                 230                 235

     5      tca ttt act gat aaa gaa ctc ttg gcc tat gca aaa gct gga gca gta     831
            Ser Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val
                    240                 245                 250

            gct gaa gaa gtc tta gca gca atc aga act gtg att gcc ttt gga gga     879
            Ala Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly
    10      255                 260                 265                 270

            caa aag aaa gaa ctt gaa agg tac aac aaa aat tta gaa gaa gct aaa     927
            Gln Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys
                            275                 280                 285
    15
            aga att ggg ata aag aaa gct atc acg gcc aac att tct att ggt gcc     975
            Arg Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala
                            290                 295                 300
    20
            gct ttc tta ttg atc tat gca tca tat gct ctg gct ttc tgg tat ggg    1023
            Ala Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly
                    305                 310                 315

    25      acc tcc ttg gtc ctc tcc agt gaa tat act att gga cag gta ctc act    1071
            Thr Ser Leu Val Leu Ser Ser Glu Tyr Thr Ile Gly Gln Val Leu Thr
                    320                 325                 330

            gtc ttc ttt tct gta tta att ggg gct ttt agt att gga cag gca tcc    1119
            Val Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly Gln Ala Ser
    30      335                 340                 345                 350

            cca agc att gaa gca ttt gca aac gca aga gga gca gct tat gaa atc    1167
            Pro Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile
                            355                 360                 365
    35
            ttc aag ata att gac aat aaa cca agc att gac agc tat tcg aag agt    1215
            Phe Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser
                            370                 375                 380

    40      gga cat aaa cca gat aat att aag gga aat ttg gaa ttc aaa aat gtt    1263
            Gly His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Lys Asn Val
                    385                 390                 395

            cac ttc agt tac cct tct cga aaa gaa gtt aag atc tta aag ggt ctc    1311
    45      His Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu
                    400                 405                 410

            aac ctg aag gtt cag agt ggg cag aca gtg gcg ctg gtt ggg aac agt    1359
            Asn Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser
    50      415                 420                 425                 430

            ggc tgc ggg aag agc acg acc gtg cag ctg atg cag agg ctc tat gac    1407
            Gly Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp
                            435                 440                 445
    55
            ccc aca gat ggc atg gtc tgt att gat gga cag gac att agg acc ata    1455
            Pro Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile Arg Thr Ile
                    450                 455                 460

    60      aat gta agg cat ctt cgg gaa att act ggt gtg gtg agt cag gag cct    1503
```

```
              Asn Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser Gln Glu Pro
                      465                 470                 475

      5       gtg ttg ttt gcc acc acg ata gct gaa aac att cgc tat ggc cgc gaa    1551
              Val Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu
                      480                 485                 490

              aat gtc acc atg gat gag att gag aaa gct gtt aag gaa gcc aat gcc    1599
     10       Asn Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala
              495                 500                 505                 510

              tat gat ttt atc atg aaa cta cct aat aaa ttt gac act ctg gtt gga    1647
              Tyr Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr Leu Val Gly
     15                   515                 520                 525

              gag aga ggg gcc cgg ctg agt ggt gga cag aaa cag aga atc gcc att    1695
              Glu Arg Gly Ala Arg Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile
                              530                 535                 540

     20       gct cgg gcc ctg gtt cgc aac ccc aag att ctt ctg ctg gat gag gca    1743
              Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala
                      545                 550                 555

     25       acg tca gct ctg gac act gaa agt gaa gca gtg gtt cag gtg gcc ctg    1791
              Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu
                      560                 565                 570

              gat aag gcc aga aaa ggc cgg act acc att gtg ata gct cat cgt ttg    1839
     30       Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu
              575                 580                 585                 590

              tct aca gtt cgt aat gcc gat gtc att gct ggt ttt gat gat gga gtc    1887
              Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val
     35                   595                 600                 605

              att gtg gag aaa gga aat cat gat gaa ctc atg aaa gag aag ggc att    1935
              Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile
                      610                 615                 620

     40       tac ttc aaa ctt gtc aca atg cag aca aga gga aat gaa att gag tta    1983
              Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Glu Leu
                      625                 630                 635

     45       gaa aat gcc act ggt gaa tcc aaa agt gaa agt gat gcc ttg gaa atg    2031
              Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met
                      640                 645                 650

              tct cca aaa gat tca ggg tcc agt tta ata aaa aga aga tca act cgc    2079
     50       Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg
              655                 660                 665                 670

              agg agt ata cat gca cca caa ggc caa gac aga aag ctt ggt aca aaa    2127
              Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys
     55                   675                 680                 685

              gag gac ttg aat gag aat gtt cct tca gtt tcc ttc tgg agg att ctg    2175
              Glu Asp Leu Asn Glu Asn Val Pro Ser Val Ser Phe Trp Arg Ile Leu
                      690                 695                 700

     60       aag ctg aac tca act gaa tgg cct tat ttt gtg gtt ggt ata ttt tgt    2223
```

```
        Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys
                705                 710                 715

        gct att ata aac gga ggc ctg caa cca gca ttt tca ata ata ttt tca    2271
     5  Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser
                720                 725                 730

        agg att ata ggg atc ttt acc cga gat gag gat cct gaa aca aaa cga    2319
        Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg
    10  735                 740                 745                 750

        cag aat agt aac atg ttt tct gta ttg ttt cta gtc ctt gga att att    2367
        Gln Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile
                        755                 760                 765
    15

        tct ttt att aca ttt ttc ctc cag ggc ttc aca ttt ggc aaa gct ggg   2415
        Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly
                        770                 775                 780

    20  gag atc ctc act aag cgg ctt cga tac atg gtt ttc aga tcc atg ctg    2463
        Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu
                        785                 790                 795

        aga cag gat gtc agc tgg ttt gat gac cct aaa aac acc act gga gca    2511
    25  Arg Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala
                800                 805                 810

        ttg aca acc agg ctt gcc aat gat gcg gct caa gtt aaa ggg gct ata    2559
        Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile
    30  815                 820                 825                 830

        ggt tcc agg ctt gct gtc att acc cag aat ata gca aat ctt ggg aca    2607
        Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr
                        835                 840                 845
    35

        ggc att att ata tcc tta atc tat ggt tgg caa tta aca ctt tta ctc   2655
        Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu
                        850                 855                 860

    40  tta gca att gta ccc atc att gca ata gca gga gtt gtt gaa atg aaa    2703
        Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys
                        865                 870                 875

        atg ttg tct gga caa gca ctg aaa gat aag aaa gag cta gaa gga gct   2751
    45  Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala
                880                 885                 890

        ggg aag att gct aca gaa gcc atc gaa aac ttc cga act gtt gtt tct   2799
        Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser
    50  895                 900                 905                 910

        ttg act cgg gag cag aag ttt gaa tac atg tat gca cag agt ttg caa   2847
        Leu Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln Ser Leu Gln
                        915                 920                 925
    55

        gta cca tac aga aac tct ttg agg aaa gca cac atc ttc ggg gtc tca   2895
        Val Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Val Ser
                        930                 935                 940

    60  ttt tct atc acc cag gca atg atg tat ttt tcc tat gct ggc tgt ttc   2943
```

```
                Phe Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe
                         945                 950                 955

        5       cgg ttt ggt gcc tac ttg gtg gca aat gag ttc atg aac ttt cag gat    2991
                Arg Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn Phe Gln Asp
                         960                 965                 970

                gtt ctt ttg gta ttc tca gct att gtc ttt ggt gcc atg gca gtg ggg    3039
        10      Val Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met Ala Val Gly
                975                 980                 985                 990

                cag gtc agt tca ttt gct cct gac tat gcc aaa gcc aaa gta tca gca    3087
                Gln Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala
        15               995                 1000                1005

                gcc cac gtc atc atg atc att gaa aaa agc cct ctg att gac agc tac    3135
                Ala His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile Asp Ser Tyr
                         1010                1015                1020

        20      agc cct cac ggc ctc aag cca aat acg ttg gaa gga aat gtg aca ttt    3183
                Ser Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe
                         1025                1030                1035

                aat gag gtc gtg ttc aac tat ccc act cga cca gac atc ccc gtg ctc    3231
        25      Asn Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu
                         1040                1045                1050

                cag ggg ctg agc ctc gag gtg aag aag ggc cag acg ctg gcc ctc gta    3279
        30      Gln Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val
                1055                1060                1065                1070

                ggt agc agt ggc tgt ggg aag agc aca gtt gtt cag ctc cta gag cgc    3327
                Gly Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg
        35               1075                1080                1085

                ttc tat gac ccc ttg gct ggt tca gtg cta att gat ggc aaa gag ata    3375
                Phe Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly Lys Glu Ile
                         1090                1095                1100

        40      aag cac ctg aat gtc cag tgg ctc cga gca cac ctg ggc atc gtg tct    3423
                Lys His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser
                         1105                1110                1115

                cag gag ccc atc ctg ttt gac tgc agc att gcc gag aac att gcc tat    3471
        45      Gln Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr
                1120                1125                1130

                gga gac aac agc cgg gtc gta tca cat gaa gag att atg cag gca gcc    3519
        50      Gly Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Met Gln Ala Ala
                1135                1140                1145                1150

                aag gag gcc aac ata cac cac ttc atc gag aca ctc cct gag aaa tac    3567
                Lys Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro Glu Lys Tyr
        55               1155                1160                1165

                aac acc aga gta gga gac aaa gga acc cag ctc tct ggt ggc cag aaa    3615
                Asn Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys
                         1170                1175                1180

        60      cag cgc att gcc ata gct cgc gct ctt gtt aga cag cct cat att ttg    3663
```

```
        Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu
             1185                1190                1195

  5     ctt ttg gat gaa gct aca tca gct ctg gat aca gaa agt gaa aag gtt      3711
        Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val
             1200                1205                1210

        gtc caa gaa gcc ctg gac aaa gcc aga gaa ggc cgc acc tgc att gtg      3759
 10     Val Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val
        1215                1220                1225                1230

        atc gcc cac cgc ttg tcc acc atc cag aat gca gat tta ata gtg gtg      3807
        Ile Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val
 15                    1235                1240                1245

        ttt cag aat ggc aaa gtc aag gag cat ggc aca cat caa cag ctg ctg      3855
        Phe Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln Gln Leu Leu
                       1250                1255                1260

 20     gct cag aaa ggc atc tat ttt tcc atg atc agt gtc cag gct gga gca      3903
        Ala Gln Lys Gly Ile Tyr Phe Ser Met Ile Ser Val Gln Ala Gly Ala
             1265                1270                1275

        aag cgc tag tgaactgtgg ccatatgagc tgttaaatat tttttaatat            3952
 25     Lys Arg
             1280


        ttgtgttaaa acatggcatt taatcaaagt taaaaggtga gcacttactg gaaaaactat    4012
        gtagaactac ctgtttaaca tttcttgctg caactgaaga tcattccacc aagttcagag    4072
 30     tcttcagatt ttataattaa aggaaccaaa agaaacatta tctgatggaa taaaatattg    4132
        gtgttaattg cattataaaa ttatagagta attcaaagta gattttgtta ataaattgta    4192
        taattttgt ttatatttta tttgtaactt actgctttgc tgaaagatta tagaagtggt    4252
        aaaaagtact gaatgtttga ataaagtgct agctataata aaactaaact tttatatgaa    4312
        aaaaa                                                                 1
 35
            <210> 4
            <211> 1280
            <212> PRT
            <213> Canis familiaris
 40

            <400> 4
        Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu Lys Asn Phe Trp
        1             5                 10                15
 45     Lys Met Gly Lys Lys Ser Lys Lys Glu Lys Lys Glu Lys Lys Pro Thr
                      20                25                30
        Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn Trp Leu Asp Arg Leu
                  35                40                45
        Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile His Gly Ala Ala Leu
              50                55                60
 50     Pro Leu Met Met Leu Val Phe Gly Asn Met Thr Asp Ser Phe Ala Asn
        65                70                75                80
        Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val Ile Ile Asn Glu Ser
                      85                90                95
        Ile Thr Asn Asn Thr Gln His Phe Ile Asn His Leu Glu Glu Glu Met
 55                100               105               110
        Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu Val
              115               120               125
        Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln
              130               135               140
 60     Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln Glu
```

```
        145                    150                         155                        160
        Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg Leu
                            165                 170                     175
     5  Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Val Gly
                        180                 185                     190
        Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr Gly Phe Ile Val Gly
                    195                 200                     205
        Phe Thr Pro Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser Pro
                210                 215                     220
    10  Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys Ile Leu Ser Ser Phe
        225                 230                 235                     240
        Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu
                        245                 250                     255
    15  Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln Lys
                    260                 265                     270
        Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile
                275                 280                     285
        Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe
                290                 295                     300
    20  Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Ser
        305                 310                 315                     320
        Leu Val Leu Ser Ser Glu Tyr Thr Ile Gly Gln Val Leu Thr Val Phe
                        325                 330                     335
        Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly Gln Ala Ser Pro Ser
    25                  340                 345                     350
        Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe Lys
                    355                 360                     365
        Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly His
                370                 375                     380
    30  Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Lys Asn Val His Phe
        385                 390                 395                     400
        Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu
                        405                 410                     415
        Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys
    35                  420                 425                     430
        Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr
                    435                 440                     445
        Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile Arg Thr Ile Asn Val
                450                 455                     460
    40  Arg His Leu Arg Glu Ile Thr Gly Val Val Ser Gln Glu Pro Val Leu
        465                 470                 475                     480
        Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn Val
                        485                 490                     495
    45  Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp
                    500                 505                     510
        Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr Leu Val Gly Glu Arg
                515                 520                     525
        Gly Ala Arg Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg
                530                 535                     540
    50  Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser
        545                 550                 555                     560
        Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp Lys
                        565                 570                     575
        Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser Thr
    55                  580                 585                     590
        Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val
                    595                 600                     605
        Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe
                610                 615                     620
    60  Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Glu Leu Glu Asn
```

```
                   625                         630                         635                         640
              Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met Ser Pro
                            645                         650                         655
         5    Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg Arg Ser
                            660                         665                         670
              Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys Glu Asp
                            675                         680                         685
              Leu Asn Glu Asn Val Pro Ser Val Ser Phe Trp Arg Ile Leu Lys Leu
                            690                         695                         700
        10    Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys Ala Ile
              705                         710                         715                         720
              Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser Arg Ile
                            725                         730                         735
              Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg Gln Asn
        15                  740                         745                         750
              Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile Ser Phe
                            755                         760                         765
              Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile
                            770                         775                         780
        20    Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg Gln
              785                         790                         795                         800
              Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr
                            805                         810                         815
              Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly Ser
        25                  820                         825                         830
              Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile
                            835                         840                         845
              Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala
                    850                         855                         860
        30    Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu
              865                         870                         875                         880
              Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys
                            885                         890                         895
              Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr
        35                  900                         905                         910
              Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln Ser Leu Gln Val Pro
                            915                         920                         925
              Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Val Ser Phe Ser
                    930                         935                         940
        40    Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe
              945                         950                         955                         960
              Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn Phe Gln Asp Val Leu
                            965                         970                         975
              Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met Ala Val Gly Gln Val
        45                  980                         985                         990
              Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala His
                    995                         1000                        1005
              Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile Asp Ser Tyr Ser Pro
                    1010                        1015                        1020
        50    His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn Glu
              1025                        1030                        1035                        1040
              Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln Gly
                            1045                        1050                        1055
              Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser
        55                  1060                        1065                        1070
              Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr
                    1075                        1080                        1085
              Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly Lys Glu Ile Lys His
                    1090                        1095                        1100
        60    Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu
```

```
           1105                  1110                     1115                   1120
           Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp
                               1125                     1130                    1135
           Asn Ser Arg Val Val Ser His Glu Glu Ile Met Gln Ala Ala Lys Glu
     5               1140                     1145                    1150
           Ala Asn Ile His His Phe Ile Glu Thr Leu Pro Glu Lys Tyr Asn Thr
                    1155                     1160                    1165
           Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg
                1170                     1175                    1180
    10     Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu
        1185                     1190                     1195                    1200
           Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln
                         1205                     1210                    1215
           Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile Ala
    15               1220                     1225                    1230
           His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln
                    1235                     1240                    1245
           Asn Gly Lys Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln
                1250                     1255                    1260
    20     Lys Gly Ile Tyr Phe Ser Met Ile Ser Val Gln Ala Gly Ala Lys Arg
        1265                     1270                     1275                    1280


           <210> 5
           <211> 1107
    25     <212> DNA
           <213> Canis familiaris


           <220>
           <221> CDS
    30     <222> (1)...(1107)


           <400> 5
           acg tca gct ctg gac act gaa agt gaa gca gtg gtt cag gtg gcc ctg      48
           Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu
    35     1               5                   10                  15


           gat aag gcc aga aaa ggc cgg act acc att gtg ata gct cat cgt ttg      96
           Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu
    40                 20                  25                  30


           tct aca gtt cgt aat gcc gat gtc att gct ggt ttt gat gat gga gtc     144
           Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val
                       35                  40                  45
    45
           att gtg gag aaa gga aat cat gat gaa ctc atg aaa gag aaa ggc att     192
           Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile
                   50                  55                  60


           tac ttc aaa ctt gtc aca atg cag aca aga gga aat gaa att gac tta     240
    50     Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Asp Leu
           65                  70                  75                  80


           gaa aat gcc act ggt gaa tcc aaa agt gaa agt gat gcc ttg gaa atg     288
           Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met
    55                       85                  90                  95


           tct cca aaa gat tca ggg tcc agt tta ata aaa aga aga tca act cgc     336
           Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg
    60                 100                 105                 110
```

```
     agg agt ata cat gca cca caa ggc caa gac aga aag ctt ggt aca aaa    384
     Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys
             115             120                 125

     gag gac ttg aat gag aat gta cct cca gtt tcc ttc tgg agg att ctg    432
     Glu Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp Arg Ile Leu
             130             135                 140

     aag ctg aac tca act gaa tgg cct tat ttt gtg gtt ggt ata ttt tgt    480
     Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys
     145             150                 155                 160

     gct att ata aac gga ggc ctg cag cca gca ttt tca ata ata ttt tca    528
     Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser
                 165             170                 175

     agg att ata ggg atc ttt acc cga gat gag gat cct gaa aca aaa cga    576
     Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg
                 180             185                 190

     cag att agt aac atg ttt tct gta ttg ttt cta gtc ctt gga att att    624
     Gln Ile Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile
             195             200                 205

     tct ttt att aca ttt ttc ctt cag ggt ttc aca ttt ggc aaa gct gga    672
     Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly
         210             215                 220

     gag atc ctc act aag cgg ctt cga tac atg gtt ttc aga tcc atg ctg    720
     Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu
     225             230                 235                 240

     aga cag gat gtc agc tgg ttt gat gac ctt aaa aac acc act gga gca    768
     Arg Gln Asp Val Ser Trp Phe Asp Asp Leu Lys Asn Thr Thr Gly Ala
                 245             250                 255

     ttg acc acc agg ctt gcc aat gat gct gct caa gtt aaa ggg gct ata    816
     Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile
                 260             265                 270

     ggt tcc agg ctt gct gtc att acc cag aat ata gca aat ctt ggg aca    864
     Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr
         275             280                 285

     ggc att att ata tcc tta atc tat ggt tgg caa tta aca ctt tta ctc    912
     Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu
         290             295                 300

     tta gca att gta ccc atc att gca ata gca gga gtt gtt gaa atg aaa    960
     Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys
     305             310                 315                 320

     atg ttg tct gga caa gca ctg aaa gat aag aaa gag cta gaa gga gct    1008
     Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala
                 325             330                 335

     ggg aag att gct aca gaa gcc atc gaa aac ttc cga act gtt gtt tct    1056
     Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser
                 340             345                 350
```

```
ttg act cag gag cag aag ttt gaa cac atg tat gca cag agt ttg cag    1104
Leu Thr Gln Glu Gln Lys Phe Glu His Met Tyr Ala Gln Ser Leu Gln
        355                 360                 365

gta                                                                1107


<210> 6
<211> 368
<212> PRT
<213> Canis familiaris


<400> 6
Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu
1               5                   10                  15
Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu
            20                  25                  30
Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val
        35                  40                  45
Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile
        50                  55                  60
Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Asp Leu
65                  70                  75                  80
Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met
                85                  90                  95
Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg
            100                 105                 110
Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys
        115                 120                 125
Glu Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp Arg Ile Leu
        130                 135                 140
Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys
145                 150                 155                 160
Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser
                165                 170                 175
Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg
            180                 185                 190
Gln Ile Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile
        195                 200                 205
Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly
        210                 215                 220
Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu
225                 230                 235                 240
Arg Gln Asp Val Ser Trp Phe Asp Asp Leu Lys Asn Thr Thr Gly Ala
                245                 250                 255
Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile
            260                 265                 270
Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr
        275                 280                 285
Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu
        290                 295                 300
Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys
305                 310                 315                 320
Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala
                325                 330                 335
Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser
            340                 345                 350
Leu Thr Gln Glu Gln Lys Phe Glu His Met Tyr Ala Gln Ser Leu Gln
        355                 360                 365


<210> 7
```

```
<211> 1280
<212> PRT
<213> Homo sapiens

<400> 7
Met Asp Leu Glu Gly Asp Arg Asn Gly Gly Ala Lys Lys Lys Asn Phe
1               5                   10                  15
Phe Lys Leu Asn Asn Lys Ser Glu Lys Asp Lys Lys Glu Lys Lys Pro
            20                  25                  30
Thr Val Ser Val Phe Ser Met Phe Arg Tyr Ser Asn Trp Leu Asp Lys
        35                  40                  45
Leu Tyr Met Val Val Gly Thr Leu Ala Ala Ile Ile His Gly Ala Gly
    50                  55                  60
Leu Pro Leu Met Met Leu Val Phe Gly Glu Met Thr Asp Ile Phe Ala
65                  70                  75                  80
Asn Ala Gly Asn Leu Glu Asp Leu Met Ser Asn Ile Thr Asn Arg Ser
            85                  90                  95
Asp Ile Asn Asp Thr Gly Phe Phe Met Asn Leu Glu Glu Asp Met Thr
        100                 105                 110
Arg Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu Val Ala
    115                 120                 125
Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln Ile
    130                 135                 140
His Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln Glu Ile
145                 150                 155                 160
Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg Leu Thr
                165                 170                 175
Asp Asp Val Ser Lys Ile Asn Glu Val Ile Gly Asp Lys Ile Gly Met
            180                 185                 190
Phe Phe Gln Ser Met Ala Thr Phe Phe Thr Gly Phe Ile Val Gly Phe
        195                 200                 205
Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser Pro Val
    210                 215                 220
Leu Gly Leu Ser Ala Ala Val Trp Ala Lys Ile Leu Ser Ser Phe Thr
225                 230                 235                 240
Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu Glu
                245                 250                 255
Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln Lys Lys
        260                 265                 270
Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile Gly
    275                 280                 285
Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe Leu
    290                 295                 300
Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Thr Leu
305                 310                 315                 320
Val Leu Ser Gly Glu Tyr Ser Ile Gly Gln Val Leu Thr Val Phe Phe
                325                 330                 335
Ser Val Leu Ile Gly Ala Phe Ser Val Gly Gln Ala Ser Pro Ser Ile
        340                 345                 350
Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe Lys Ile
    355                 360                 365
Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly His Lys
    370                 375                 380
Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Arg Asn Val His Phe Ser
385                 390                 395                 400
Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu Lys
                405                 410                 415
Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys Gly
        420                 425                 430
Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr Glu
```

```
                435                        440                        445
    Gly Met Val Ser Val Asp Gly Gln Asp Ile Arg Thr Ile Asn Val Arg
        450                        455                        460
    Phe Leu Arg Glu Ile Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe
    465                        470                        475                        480
    Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn Val Thr
                        485                        490                        495
    Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp Phe
                    500                        505                        510
    Ile Met Lys Leu Pro His Lys Phe Asp Thr Leu Val Gly Glu Arg Gly
            515                        520                        525
    Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala
        530                        535                        540
    Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala
    545                        550                        555                        560
    Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp Lys Ala
                        565                        570                        575
    Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser Thr Val
                    580                        585                        590
    Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val Glu
            595                        600                        605
    Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe Lys
        610                        615                        620
    Leu Val Thr Met Gln Thr Ala Gly Asn Glu Val Glu Leu Glu Asn Ala
    625                        630                        635                        640
    Ala Asp Glu Ser Lys Ser Glu Ile Asp Ala Leu Glu Met Ser Ser Asn
                        645                        650                        655
    Asp Ser Arg Ser Ser Leu Ile Arg Lys Arg Ser Thr Arg Arg Ser Val
                    660                        665                        670
    Arg Gly Ser Gln Ala Gln Asp Arg Lys Leu Ser Thr Lys Glu Ala Leu
            675                        680                        685
    Asp Glu Ser Ile Pro Pro Val Ser Phe Trp Arg Ile Met Lys Leu Asn
        690                        695                        700
    Leu Thr Glu Trp Pro Tyr Phe Val Val Gly Val Phe Cys Ala Ile Ile
    705                        710                        715                        720
    Asn Gly Gly Leu Gln Pro Ala Phe Ala Ile Ile Phe Ser Lys Ile Ile
                        725                        730                        735
    Gly Val Phe Thr Arg Ile Asp Asp Pro Glu Thr Lys Arg Gln Asn Ser
                    740                        745                        750
    Asn Leu Phe Ser Leu Leu Phe Leu Ala Leu Gly Ile Ile Ser Phe Ile
            755                        760                        765
    Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile Leu
        770                        775                        780
    Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg Gln Asp
    785                        790                        795                        800
    Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr Thr
                        805                        810                        815
    Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly Ser Arg
                    820                        825                        830
    Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile Ile
            835                        840                        845
    Ile Ser Phe Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala Ile
        850                        855                        860
    Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu Ser
    865                        870                        875                        880
    Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys Ile
                        885                        890                        895
    Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr Gln
                    900                        905                        910
    Glu Gln Lys Phe Glu His Met Tyr Ala Gln Ser Leu Gln Val Pro Tyr
```

```
                   915                        920                         925
        Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Ile Thr Phe Ser Phe
            930                        935                     940
   5    Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe Gly
        945                        950                     955                960
        Ala Tyr Leu Val Ala His Lys Leu Met Ser Phe Glu Asp Val Leu Leu
                        965                        970                     975
        Val Phe Ser Ala Val Val Phe Gly Ala Met Ala Val Gly Gln Val Ser
  10                    980                        985                     990
        Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Ile Ser Ala Ala His Ile
                    995                        1000                    1005
        Ile Met Ile Ile Glu Lys Thr Pro Leu Ile Asp Ser Tyr Ser Thr Glu
            1010                       1015                    1020
  15    Gly Leu Met Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Gly Glu Val
        1025                       1030                    1035                1040
        Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln Gly Leu
                        1045                       1050                    1055
        Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser Ser
                    1060                       1065                    1070
  20    Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr Asp
                1075                       1080                    1085
        Pro Leu Ala Gly Lys Val Leu Leu Asp Gly Lys Glu Ile Lys Arg Leu
            1090                       1095                    1100
        Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu Pro
  25    1105                       1110                    1115                1120
        Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp Asn
                        1125                       1130                    1135
        Ser Arg Val Val Ser Gln Glu Glu Ile Val Arg Ala Ala Lys Glu Ala
                    1140                       1145                    1150
  30    Asn Ile His Ala Phe Ile Glu Ser Leu Pro Asn Lys Tyr Ser Thr Lys
                1155                       1160                    1165
        Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile
            1170                       1175                    1180
        Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu Asp
  35    1185                       1190                    1195                1200
        Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln Glu
                        1205                       1210                    1215
        Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile Ala His
                    1220                       1225                    1230
  40    Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln Asn
                1235                       1240                    1245
        Gly Arg Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln Lys
            1250                       1255                    1260
        Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Thr Lys Arg Gln
  45    1265                       1270                    1275                1280
```

        <210> 8
        <211> 1279
        <212> PRT
  50   <213> Homo sapiens

        <400> 8

```
        Met Asp Leu Glu Gly Asp Arg Asn Gly Gly Ala Lys Lys Lys Asn Phe
        1               5                   10                  15
  55    Phe Lys Leu Asn Asn Lys Ser Glu Lys Asp Lys Glu Lys Lys Pro
                    20                  25                  30
        Thr Val Ser Val Phe Ser Met Phe Arg Tyr Ser Asn Trp Leu Asp Lys
                    35                  40                  45
        Leu Tyr Met Val Val Gly Thr Leu Ala Ala Ile Ile His Gly Ala Gly
  60            50                  55                  60
```

```
      Leu Pro Leu Met Met Leu Val Phe Gly Glu Met Thr Asp Ile Phe Ala
      65              70                  75                      80
      Asn Ala Gly Asn Leu Glu Asp Leu Met Ser Asn Ile Thr Asn Arg Ser
                      85                  90                  95
 5    Asp Ile Asn Asp Thr Gly Phe Phe Met Asn Leu Glu Glu Asp Met Thr
                  100             105             110
      Arg Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu Val Ala
              115             120             125
10    Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln Ile
              130             135             140
      His Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln Glu Ile
      145             150             155             160
      Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg Leu Thr
                      165             170             175
15    Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Ile Gly Met
                  180             185             190
      Phe Phe Gln Ser Met Ala Thr Phe Phe Thr Gly Phe Ile Val Gly Phe
                  195             200             205
      Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser Pro Val
20        210             215             220
      Leu Gly Leu Ser Ala Ala Val Trp Ala Lys Ile Leu Ser Ser Phe Thr
      225             230             235             240
      Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu Glu
                  245             250             255
25    Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln Lys Lys
                  260             265             270
      Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile Gly
                  275             280             285
      Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe Leu
30        290             295             300
      Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Thr Leu
      305             310             315             320
      Val Leu Ser Gly Glu Tyr Ser Ile Gly Gln Val Leu Thr Val Phe Ser
                  325             330             335
35    Val Leu Ile Gly Ala Phe Ser Val Gly Gln Ala Ser Pro Ser Ile Glu
                  340             345             350
      Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe Lys Ile Ile
                  355             360             365
      Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly His Lys Pro
40        370             375             380
      Asp Asn Ile Lys Gly Asn Leu Glu Phe Arg Asn Val His Phe Ser Tyr
      385             390             395             400
      Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu Lys Val
                  405             410             415
45    Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys Gly Lys
                  420             425             430
      Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr Glu Gly
              435             440             445
      Met Val Ser Val Asp Gly Gln Asp Ile Arg Thr Ile Asn Val Arg Phe
50        450             455             460
      Leu Arg Glu Ile Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Ala
      465             470             475             480
      Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn Val Thr Met
                  485             490             495
55    Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp Phe Ile
                  500             505             510
      Met Lys Leu Pro His Lys Phe Asp Thr Leu Val Gly Glu Arg Gly Ala
              515             520             525
      Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu
60        530             535             540
```

```
Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu
545                 550                 555                 560
Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp Lys Ala Arg
                565                 570                 575
Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser Thr Val Arg
                580                 585                 590
Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val Glu Lys
                595                 600                 605
Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe Lys Leu
        610                 615                 620
Val Thr Met Gln Thr Ala Gly Asn Glu Val Glu Leu Glu Asn Ala Ala
625                 630                 635                 640
Asp Glu Ser Lys Ser Glu Ile Asp Ala Leu Glu Met Ser Ser Asn Asp
                645                 650                 655
Ser Arg Ser Ser Leu Ile Arg Lys Arg Ser Thr Arg Arg Ser Val Arg
                660                 665                 670
Gly Ser Gln Ala Gln Asp Arg Lys Leu Ser Thr Lys Glu Ala Leu Asp
        675                 680                 685
Glu Ser Ile Pro Pro Val Ser Phe Trp Arg Ile Met Lys Leu Asn Leu
        690                 695                 700
Thr Glu Trp Pro Tyr Phe Val Val Gly Val Phe Cys Ala Ile Ile Asn
705                 710                 715                 720
Gly Gly Leu Gln Pro Ala Phe Ala Ile Ile Phe Ser Lys Ile Ile Gly
                725                 730                 735
Val Phe Thr Arg Ile Asp Asp Pro Glu Thr Lys Arg Gln Asn Ser Asn
                740                 745                 750
Leu Phe Ser Leu Leu Phe Leu Ala Leu Gly Ile Ile Ser Phe Ile Thr
                755                 760                 765
Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile Leu Thr
        770                 775                 780
Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg Gln Asp Val
785                 790                 795                 800
Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr Thr Arg
                805                 810                 815
Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly Ser Arg Leu
                820                 825                 830
Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile Ile Ile
                835                 840                 845
Ser Phe Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala Ile Val
        850                 855                 860
Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu Ser Gly
865                 870                 875                 880
Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys Ile Ala
                885                 890                 895
Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr Gln Glu
                900                 905                 910
Gln Lys Phe Glu His Met Tyr Ala Gln Ser Leu Gln Val Pro Tyr Arg
                915                 920                 925
Asn Ser Leu Arg Lys Ala His Ile Phe Gly Ile Thr Phe Ser Phe Thr
        930                 935                 940
Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe Gly Ala
945                 950                 955                 960
Tyr Leu Val Ala His Lys Leu Met Ser Phe Glu Asp Val Leu Leu Val
                965                 970                 975
Phe Ser Ala Val Val Phe Gly Ala Met Ala Val Gly Gln Val Ser Ser
                980                 985                 990
Phe Ala Pro Asp Tyr Ala Lys Ala Lys Ile Ser Ala Ala His Ile Ile
                995                 1000                1005
Met Ile Ile Glu Lys Thr Pro Leu Ile Asp Ser Tyr Ser Thr Glu Gly
        1010                1015                1020
```

```
Leu Met Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Gly Glu Val Val
1025                1030                1035                1040
Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln Gly Leu Ser
                1045                1050                1055
Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser Ser Gly
                1060                1065                1070
Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr Asp Pro
            1075                1080                1085
Leu Ala Gly Lys Val Leu Leu Asp Gly Lys Glu Ile Lys Arg Leu Asn
        1090                1095                1100
Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu Pro Ile
1105            1110                1115                1120
Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp Asn Ser
                1125                1130                1135
Arg Val Val Ser Gln Glu Glu Ile Val Arg Ala Ala Lys Glu Ala Asn
            1140                1145                1150
Ile His Ala Phe Ile Glu Ser Leu Pro Asn Lys Tyr Ser Thr Lys Val
        1155                1160                1165
Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala
        1170                1175                1180
Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu Asp Glu
1185                1190                1195                1200
Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln Glu Ala
                1205                1210                1215
Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile Ala His Arg
            1220                1225                1230
Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln Asn Gly
        1235                1240                1245
Arg Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln Lys Gly
        1250                1255                1260
Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Thr Lys Arg Gln
1265                1270                1275
```

```
<210> 9
<211> 24
<212> DNA
<213> Homo sapiens

<400> 9
gaactgtgat tgcgtttgga ggac                                          24

<210> 10
<211> 22
<212> DNA
<213> Canis familiaris

<400> 10
ttcagggccg cctgtacctc tg                                            22

<210> 11
<211> 22
<212> DNA
<213> Canis familiaris

<400> 11
ccccacagat ggcatggtct gt                                            22

<210> 12
<211> 23
<212> DNA
```

<213> Homo sapiens

<400> 12
cgcttggtga ggatctctcc agc   23

<210> 13
<211> 24
<212> DNA
<213> Canis familiaris

<400> 13
agaaacagag aatcgccatt gctc   24

<210> 14
<211> 23
<212> DNA
<213> Homo sapiens

<400> 14
gctgcagtca aacaggatgg gct   23

<210> 15
<211> 24
<212> DNA
<213> Canis familiaris

<400> 15
agttcatttg ctcctgacta tgcc   24

<210> 16
<211> 22
<212> DNA
<213> Homo sapiens

<400> 16
gatgcctttc tgggccagca gc   22

<210> 17
<211> 30
<212> DNA
<213> Canis familiaris

<400> 17
gaggtgaaga agggccagac gctggccctc   30

<210> 18
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 18
ctaatacgac tcactatagg gcaagcagtg gtaacaacgc agagt   45

<210> 19
<211> 29
<212> DNA
<213> Canis familiaris

```
<400> 19
cgcagccact gttcccaacc agcgccact                                    29


        <210> 20
        <211> 23
        <212> DNA
        <213> Homo sapiens

        <400> 20
    ggagcgcgag gtcgggatgg atc                                       23

        <210> 21
        <211> 31
        <212> DNA
        <213> Canis familiaris

        <400> 21
    ggagaggacc aaggaggtcc cataccagaa a                              31

        <210> 22
        <211> 4279
        <212> DNA
        <213> Canis familiaris

        <220>
        <221> CDS
        <222> (17)...(3859)

        <400> 22
    ggagcgcgag gtcggg atg gat cct gaa gga ggc cgt aag ggg agt gca gag    52
                     Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu
                     1               5                   10

    aag aac ttc tgg aaa atg ggc aaa aaa agt aaa aaa aat gag aag aaa       100
    Lys Asn Phe Trp Lys Met Gly Lys Lys Ser Lys Lys Asn Glu Lys Lys
            15                  20                  25

    gaa aag aaa cca act gtc agc acg ttt gca atg ttt cgc tat tca aat       148
    Glu Lys Lys Pro Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn
            30                  35                  40

    tgg ctt gat agg ttg tat atg ttg gtg ggg aca atg gct gcc atc atc       196
    Trp Leu Asp Arg Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile
    45                  50                  55                  60

    cat gga gct gca ctc cct ctc atg atg ctg gtt ttt gga aac atg aca       244
    His Gly Ala Ala Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr
                    65                  70                  75

    gat agc ttt gca aat gca gga att tca aga aac aaa act ttt cca gtt       292
    Asp Ser Phe Ala Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val
                80                  85                  90

    ata att aat gaa agt att acg aac aat aca caa cat ttc atc aac cat       340
    Ile Ile Asn Glu Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His
                95                  100                 105

    ctg gag gag gaa atg acc acg tat gcc tat tat tac agt ggg atc ggt       388
    Leu Glu Glu Glu Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly
```

```
                  110                        115                        120

        gct ggc gtg ctg gtg gct gct tac atc cag gtt tca ttc tgg tgc ctg    436
    5   Ala Gly Val Leu Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu
        125                 130                 135                 140

        gca gca gga aga cag ata ctc aaa att aga aaa caa ttt ttt cat gct    484
        Ala Ala Gly Arg Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala
   10                       145                 150                 155

        atc atg cga cag gag att ggc tgg ttt gac gtg cat gac gtt ggg gag    532
        Ile Met Arg Gln Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu
                            160                 165                 170

   15   ctt aac acc cgg ctc aca gac gat gtc tcc aaa atc aat gaa gga att    580
        Leu Asn Thr Arg Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile
                            175                 180                 185

        ggc gac aaa att gga atg ttc ttt caa tca ata gca aca ttt ttc acc    628
   20   Gly Asp Lys Ile Gly Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr
                      190                 195                 200

        ggt ttt ata gtg ggg ttt aca cgt ggt tgg aag cta acc ctt gtg att    676
        Gly Phe Ile Val Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile
   25   205                 210                 215                 220

        ttg gcc atc agc cct gtt ctt gga ctt tca gcc gcc atc tgg gca aag    724
        Leu Ala Ile Ser Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys
                            225                 230                 235
   30
        ata cta tct tca ttt act gat aaa gaa ctc ttg gcc tat gca aaa gct    772
        Ile Leu Ser Ser Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala
                            240                 245                 250

   35   gga gca gta gct gaa gaa gtc tta gca gca atc aga act gtg att gcc    820
        Gly Ala Val Ala Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala
                      255                 260                 265

        ttt gga gga caa aag aaa gaa ctt gaa agg tac aac aaa aat tta gaa    868
   40   Phe Gly Gly Gln Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu
                      270                 275                 280

        gaa gct aaa gga att ggg ata aag aaa gct atc acg gcc aac att tct    916
        Glu Ala Lys Gly Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser
   45   285                 290                 295                 300

        att ggt gcc gct ttc tta ttg atc tat gca tca tat gct ctg gct ttc    964
        Ile Gly Ala Ala Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe
                            305                 310                 315
   50
        tgg tat ggg acc tcc ttg gtc ctc tcc agt gaa tat tct att gga caa   1012
        Trp Tyr Gly Thr Ser Leu Val Leu Ser Ser Glu Tyr Ser Ile Gly Gln
                            320                 325                 330

   55   gta ctc act gtc ttc ttt tct gta tta att ggg gct ttt agt att gga   1060
        Val Leu Thr Val Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly
                            335                 340                 345

        cag gca tcc cca agc att gaa gca ttt gca aac gca aga gga gca gct   1108
   60   Gln Ala Ser Pro Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala
```

```
                350                        355                         360

      tat gaa atc ttc aag ata att gac aat aaa cca agc att gac agc tat    1156
      Tyr Glu Ile Phe Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr
  5   365                 370                 375                 380

      tcg aag agt gga cat aaa cca gat aat att aag gga aat ttg gaa ttc    1204
      Ser Lys Ser Gly His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe
 10                       385                 390                 395

      aaa aat gtt cac ttc agt tac cct tct cga aaa gaa gtt aag atc tta    1252
      Lys Asn Val His Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu
                          400                 405                 410

 15   aag ggt ctc aac ctg aag gtt cag agt ggg cag aca gtg gcg ctg gtt    1300
      Lys Gly Leu Asn Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val
                  415                 420                 425

      ggg aac agt ggc tgc ggg aag agc acg acc gtg cag ctg atg cag agg    1348
 20   Gly Asn Ser Gly Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg
              430                 435                 440

      ctc tat gac ccc aca gat ggc atg gtc tgt att gat gga cag gac att    1396
      Leu Tyr Asp Pro Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile
 25   445                 450                 455                 460

      agg acc ata aat gta agg cat ctt cgg gaa att act ggt gtg gtg agt    1444
      Arg Thr Ile Asn Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser
                          465                 470                 475
 30
      cag gag cct gtg ttg ttt gcc acc acg ata gct gaa aac att cgc tat    1492
      Gln Glu Pro Val Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr
                          480                 485                 490

 35   ggc cgc gaa aat gtc acc atg gat gag att gag aaa gct gtt aag gaa    1540
      Gly Arg Glu Asn Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu
                  495                 500                 505

      gcc aat gcc tat gat ttt atc atg aaa cta cct aat aaa ttt gac act    1588
 40   Ala Asn Ala Tyr Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr
              510                 515                 520

      ctg gtt gga gag aga ggg gcc cag ctg agt ggt gga cag aaa cag aga    1636
      Leu Val Gly Glu Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg
 45   525                 530                 535                 540

      atc gcc att gct cgg gcc ctg gtt cgc aac ccc aag att ctt ctg ctg    1684
      Ile Ala Ile Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu
                  545                 550                 555
 50
      gat gag gca acg tca gct ctg gac act gaa agt gaa gca gtg gtt cag    1732
      Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln
                  560                 565                 570

 55   gtg gcc ctg gat aag gcc aga aaa ggc cgg act acc att gtg ata gct    1780
      Val Ala Leu Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala
                  575                 580                 585

      cat cgt ttg tct aca gtt cgt aat gcc gat gtc att gct ggt ttt gat    1828
 60   His Arg Leu Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp
```

```
                590                      595                         600

       gat gga gtc att gtg gag aaa gga aat cat gat gaa ctc atg aaa gag      1876
 5     Asp Gly Val Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu
       605                 610                 615                 620


       aag ggc att tac ttc aaa ctt gtc aca atg cag aca aga gga aat gaa      1924
       Lys Gly Ile Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu
10                         625                 630                 635


       att gag tta gaa aat gcc act ggt gaa tcc aaa agt gaa agt gat gcc      1972
       Ile Glu Leu Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala
15                         640                 645                 650


       ttg gaa atg tct cca aaa gat tca ggg tcc agt tta ata aaa aga aga      2020
       Leu Glu Met Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg
20                     655                 660                 665


       tca act cgc agg agt ata cat gca cca caa ggc caa gac aga aag ctt      2068
       Ser Thr Arg Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu
           670                 675                 680


       ggt aca aaa gag gac ttg aat gag aat gta cct cca gtt tcc ttc tgg      2116
25     Gly Thr Lys Glu Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp
       685                 690                 695                 700


       agg att ctg aag ctg aac tca act gaa tgg cct tat ttt gtg gtt ggt      2164
       Arg Ile Leu Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly
30                         705                 710                 715


       ata ttt tgt gct att ata aac gga ggc ctg caa cca gca ttt tca ata      2212
       Ile Phe Cys Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile
                           720                 725                 730


35     ata ttt tca agg att ata ggg atc ttt acc cga gat gag gat cct gaa      2260
       Ile Phe Ser Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu
                   735                 740                 745


       aca aaa cga cag aat agt aac atg ttt tct gta ttg ttt cta gtc ctt      2308
40     Thr Lys Arg Gln Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu
       750                 755                 760


       gga att att tct ttt att aca ttt ttc ctc cag ggc ttc aca ttt ggc      2356
       Gly Ile Ile Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly
45     765                 770                 775                 780


       aaa gct ggg gag atc ctc act aag cgg ctt cga tac atg gtt ttc aga      2404
       Lys Ala Gly Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg
50                         785                 790                 795


       tcc atg ctg aga cag gat gtc agc tgg ttt gat gac cct aaa aac acc      2452
       Ser Met Leu Arg Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr
                           800                 805                 810


55     act gga gca ttg aca acc agg ctt gcc aat gat gcg gct caa gtt aaa      2500
       Thr Gly Ala Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys
                   815                 820                 825


       ggg gct ata ggt tcc agg ctt gct gtc att acc cag aat ata gca aat      2548
60     Gly Ala Ile Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn
```

```
                  830                        835                          840

       ctt ggg aca ggc att att ata tcc tta atc tat ggt tgg caa tta aca          2596
       Leu Gly Thr Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr
   5   845                 850                     855                 860

       ctt tta ctc tta gca att gta ccc atc att gca ata gca gga gtt gtt          2644
       Leu Leu Leu Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val
                         865                 870                     875
  10

       gaa atg aaa atg ttg tct gga caa gca ctg aaa gat aag aaa gag cta          2692
       Glu Met Lys Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu
                     880                 885                 890
  15
       gaa gga gct ggg aag att gct aca gaa gcc atc gaa aac ttc cga act          2740
       Glu Gly Ala Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr
                 895                 900                 905

  20   gtt gtt tct ttg act cgg gag cag aag ttt gaa tac atg tat gca cag          2788
       Val Val Ser Leu Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln
             910                 915                 920

       agt ttg caa gta cca tac aga aac tct ttg agg aaa gca cac atc ttc          2836
       Ser Leu Gln Val Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe
  25   925                 930                 935                 940

       ggg gtc tca ttt tct atc acc cag gca atg atg tat ttt tcc tat gct          2884
       Gly Val Ser Phe Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala
                         945                 950                 955
  30
       ggc tgt ttc cgg ttt ggt gcc tac ttg gtg gca aat gag ttc atg aac          2932
       Gly Cys Phe Arg Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn
                     960                 965                 970
  35   ttt cag gat gtt ctt ttg gta ttc tca gct att gtc ttt ggt gcc atg          2980
       Phe Gln Asp Val Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met
                 975                 980                 985

       gca gtg ggg cag gtc agt tca ttt gct cct gac tat gcc aaa gcc aaa          3028
  40   Ala Val Gly Gln Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys
             990                 995                 1000

       gta tca gca gcc cac gtc atc atg atc att gaa aaa agc cct ctg att          3076
       Val Ser Ala Ala His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile
  45   1005                1010                1015                1020

       gac agc tac agc cct cac ggc ctc aag cca aat acg ttg gaa gga aat          3124
       Asp Ser Tyr Ser Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn
                         1025                1030                1035
  50
       gtg aca ttt aat gag gtc gtg ttc aac tat ccc act cga cca gac atc          3172
       Val Thr Phe Asn Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile
                     1040                1045                1050

  55   ccc gtg ctc cag ggg ctg agc ctc gag gtg aag aag ggc cag acg ctg          3220
       Pro Val Leu Gln Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu
             1055                1060                1065

       gcc ctc gta ggt agc agt ggc tgt ggg aag agc aca gtt gtt cag ctc          3268
  60   Ala Leu Val Gly Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu
```

```
              1070                    1075                   1080
        cta gag cgc ttc tat gac ccc ttg gct ggt tca gtg cta att gat ggc    3316
        Leu Glu Arg Phe Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly
   5    1085                    1090                   1095                 1100

        aaa gag ata aag cac ctg aat gtc cag tgg ctc cga gca cac ctg ggc    3364
        Lys Glu Ile Lys His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly
  10                            1105                   1110                 1115

        atc gtg tct cag gag ccc atc ctg ttt gac tgc agc att gcc gag aac    3412
        Ile Val Ser Gln Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn
                                1120                   1125                 1130

  15    att gcc tat gga gac aac agc cgg gtc gta tca cat gaa gag att atg    3460
        Ile Ala Tyr Gly Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Met
                          1135                   1140                 1145

  20    cag gca gcc aag gag gcc aac ata cac cac ttc atc gag aca ctc cct    3508
        Gln Ala Ala Lys Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro
                          1150                   1155                 1160

        gag aaa tac aac acc aga gta gga gac aaa gga acc cag ctc tct ggt    3556
  25    Glu Lys Tyr Asn Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly
        1165                    1170                   1175                 1180

        ggc cag aaa cag cgc att gcc ata gct cgc gct ctt gtt aga cag cct    3604
        Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro
  30                      1185                   1190                 1195

        cat att ttg ctt ttg gat gaa gct aca tca gct ctg gat aca gaa agt    3652
        His Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser
                          1200                   1205                 1210

  35    gaa aag gtt gtc caa gaa gcc ctg gac aaa gcc aga gaa ggc cgc acc    3700
        Glu Lys Val Val Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr
                    1215                   1220                 1225

  40    tgc att gtg atc gcc cac cgc ttg tcc acc atc cag aat gca gat tta    3748
        Cys Ile Val Ile Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu
              1230                   1235                 1240

        ata gtg gtg ttt cag aat ggc aaa gtc aag gag cat ggc aca cat caa    3796
        Ile Val Val Phe Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln
  45    1245                    1250                   1255                 1260

        cag ctg ctg gcc cag aaa ggc atc tat ttt tcc atg gtc agt gtc cag    3844
        Gln Leu Leu Ala Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln
                          1265                   1270                 1275
  50

        gct gga gca aag cgc tagtgaactg tggccatatg agctgttaaa tatttttaa     3899
        Ala Gly Ala Lys Arg
                    1280

  55    tatttgtgtt aaaacatggc atttaatcaa agttaaaagg tgagcactta ctggaaaaac   3959
        tatgtagaac tacctgttta acatttcttg ctgcaactga agatcattcc accaagttca   4019
        gagtcttcag attttataat taaaggaacc aaaagaaaca ttatctgatg gaataaaata   4079
        ctggtgttaa ttgcattata aaattataga gtaattcaaa gtagattttg ttaataaatt   4139
        gtataatttt tgtttatatt ttatttgtaa cttactgctt tgctgaaaga ttatagaagt   4199
  60    ggtaaaaagt actgaatgtt tgaataaagt gctagctata ataaaactaa acttttatat    4259
```

caaaaaaaaa aaaaaaaaa

<210> 23
<211> 1281
<212> PRT
<213> Canis familiaris

<400> 23

Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu Lys Asn Phe Trp
1   5   10   15

Lys Met Gly Lys Lys Ser Lys Lys Asn Glu Lys Lys Glu Lys Lys Pro
            20   25   30

Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn Trp Leu Asp Arg
        35   40   45

Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile His Gly Ala Ala
    50   55   60

Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr Asp Ser Phe Ala
65   70   75   80

Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val Ile Ile Asn Glu
                85   90   95

Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His Leu Glu Glu Glu
            100   105   110

Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu
        115   120   125

Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg
    130   135   140

Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln
145   150   155   160

Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg
                165   170   175

Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Ile
            180   185   190

Gly Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr Gly Phe Ile Val
        195   200   205

Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser
    210   215   220

Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys Ile Leu Ser Ser
225   230   235   240

Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala
                245   250   255

Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln
            260   265   270

Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Gly
        275   280   285

Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala
    290   295   300

Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr
305   310   315   320

Ser Leu Val Leu Ser Ser Glu Tyr Ser Ile Gly Gln Val Leu Thr Val
                325   330   335

Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly Gln Ala Ser Pro
            340   345   350

Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe
        355   360   365

Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly
    370   375   380

His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Lys Asn Val His
385   390   395   400

Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn
                405   410   415

```
    Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly
                    420                 425                 430
    Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro
                435                 440                 445
 5  Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile Arg Thr Ile Asn
        450                 455                 460
    Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser Gln Glu Pro Val
    465                 470                 475                 480
    Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn
10                  485                 490                 495
    Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr
                500                 505                 510
    Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr Leu Val Gly Glu
                515                 520                 525
15  Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala
        530                 535                 540
    Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr
    545                 550                 555                 560
    Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp
20                  565                 570                 575
    Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser
                580                 585                 590
    Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile
            595                 600                 605
25  Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr
        610                 615                 620
    Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Glu Leu Glu
    625                 630                 635                 640
    Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met Ser
30                  645                 650                 655
    Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg Arg
                660                 665                 670
    Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys Glu
            675                 680                 685
35  Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp Arg Ile Leu Lys
        690                 695                 700
    Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys Ala
    705                 710                 715                 720
    Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser Arg
40                  725                 730                 735
    Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg Gln
                740                 745                 750
    Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile Ser
            755                 760                 765
45  Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu
        770                 775                 780
    Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg
    785                 790                 795                 800
    Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu
50                  805                 810                 815
    Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly
                820                 825                 830
    Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly
            835                 840                 845
55  Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu
        850                 855                 860
    Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met
    865                 870                 875                 880
    Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly
60                  885                 890                 895
```

```
Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu
            900                 905                 910
Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln Ser Leu Gln Val
            915                 920                 925
Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Val Ser Phe
            930                 935                 940
Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg
945                 950                 955                 960
Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn Phe Gln Asp Val
                965                 970                 975
Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met Ala Val Gly Gln
                980                 985                 990
Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala
                995                 1000                1005
His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile Asp Ser Tyr Ser
    1010                1015                1020
Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn
1025                1030                1035                1040
Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln
                1045                1050                1055
Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly
            1060                1065                1070
Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe
            1075                1080                1085
Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly Lys Glu Ile Lys
            1090                1095                1100
His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln
1105                1110                1115                1120
Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly
                1125                1130                1135
Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Met Gln Ala Ala Lys
            1140                1145                1150
Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro Glu Lys Tyr Asn
            1155                1160                1165
Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln
            1170                1175                1180
Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu
1185                1190                1195                1200
Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val
                1205                1210                1215
Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile
            1220                1225                1230
Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe
    1235                1240                1245
Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala
1250                1255                1260
Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Ala Lys
1265                1270                1275                1280
Arg
```

```
<210> 24
<211> 4279
<212> DNA
<213> Canis familiaris

<220>
<221> CDS
<222> (17)...(3859)
```

<400> 24

```
ggagcgcgag gtcggg atg gat cct gaa gga ggc cgt aag ggg agt gca gag       52
                   Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu
                    1             5                    10

aag aac ttc tgg aaa atg ggc aaa aaa agt aaa aaa aaa gag aag aaa        100
Lys Asn Phe Trp Lys Met Gly Lys Lys Ser Lys Lys Lys Glu Lys Lys
         15              20                  25

gaa aag aaa cca act gtc agc acg ttt gca atg ttt cgc tat tca aat       148
Glu Lys Lys Pro Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn
         30              35                  40

tgg ctt gat agg ttg tat atg ttg gtg ggg aca atg gct gcc atc atc       196
Trp Leu Asp Arg Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile
 45              50                  55                  60

cat gga gct gca ctc cct ctc atg atg ctg gtt ttt gga aac atg aca       244
His Gly Ala Ala Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr
                 65              70                  75

gat agc ttt gca aat gca gga att tca aga aac aaa act ttt cca gtt       292
Asp Ser Phe Ala Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val
                 80              85                  90

ata att aat gaa agt att acg aac aat aca caa cat ttc atc aac cat       340
Ile Ile Asn Glu Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His
             95                  100                 105

ctg gag gag gaa atg acc acg tat gcc tat tat tac agt ggg atc ggt       388
Leu Glu Glu Glu Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly
 110                 115                 120

gct ggc gtg ctg gtg gct gct tac atc cag gtt tca ttc tgg tgc ctg       436
Ala Gly Val Leu Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu
125                 130                 135                 140

gca gca gga aga cag ata ctc aaa att aga aaa caa ttt ttt cat gct       484
Ala Ala Gly Arg Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala
                 145                 150                 155

atc atg cga cag gag att ggc tgg ttt gac gtg cat gac gtt ggg gag       532
Ile Met Arg Gln Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu
                 160                 165                 170

ctt aac acc cgg ctc aca gac gat gtc tcc aaa atc aat gaa gga att       580
Leu Asn Thr Arg Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile
                 175                 180                 185

ggc gac aaa att gga atg ttc ttt caa tca ata gca aca ttt ttc acc       628
Gly Asp Lys Ile Gly Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr
         190                 195                 200

ggt ttt ata gtg ggg ttt aca cgt ggt tgg aag cta acc ctt gtg att       676
Gly Phe Ile Val Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile
205                 210                 215                 220

ttg gcc atc agc cct gtt ctt gga ctt tca gcc gcc atc tgg gca aag       724
Leu Ala Ile Ser Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys
                 225                 230                 235
```

```
ata cta tct tca ttt act gat aaa gaa ctc ttg gcc tat gca aaa gct    772
Ile Leu Ser Ser Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala
            240             245                 250

gga gca gta gct gaa gaa gtc tta gca gca atc aga act gtg att gcc    820
Gly Ala Val Ala Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala
            255             260                 265

ttt gga gga caa aag aaa gaa ctt gaa agg tac aac aaa aat tta gaa    868
Phe Gly Gly Gln Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu
    270             275                 280

gaa gct aaa gga att ggg ata aag aaa gct atc acg gcc aac att tct    916
Glu Ala Lys Gly Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser
285             290                 295                 300

att ggt gcc gct ttc tta ttg atc tat gca tca tat gct ctg gct ttc    964
Ile Gly Ala Ala Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe
            305             310                 315

tgg tat ggg acc tcc ttg gtc ctc tcc agt gaa tat tct att gga caa   1012
Trp Tyr Gly Thr Ser Leu Val Leu Ser Ser Glu Tyr Ser Ile Gly Gln
            320             325                 330

gta ctc act gtc ttc ttt tct gta tta att ggg gct ttt agt att gga   1060
Val Leu Thr Val Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly
            335             340                 345

cag gca tcc cca agc att gaa gca ttt gca aac gca aga gga gca gct   1108
Gln Ala Ser Pro Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala
    350             355                 360

tat gaa atc ttc aag ata att gac aat aaa cca agc att gac agc tat   1156
Tyr Glu Ile Phe Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr
365             370                 375                 380

tcg aag agt gga cat aaa cca gat aat att aag gga aat ttg gaa ttc   1204
Ser Lys Ser Gly His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe
            385             390                 395

aaa aat gtt cac ttc agt tac cct tct cga aaa gaa gtt aag atc tta   1252
Lys Asn Val His Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu
            400             405                 410

aag ggt ctc aac ctg aag gtt cag agt ggg cag aca gtg gcg ctg gtt   1300
Lys Gly Leu Asn Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val
            415             420                 425

ggg aac agt ggc tgc ggg aag agc acg acc gtg cag ctg atg cag agg   1348
Gly Asn Ser Gly Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg
            430             435                 440

ctc tat gac ccc aca gat ggc atg gtc tgt att gat gga cag gac att   1396
Leu Tyr Asp Pro Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile
445             450                 455                 460

agg acc ata aat gta agg cat ctt cgg gaa att act ggt gtg gtg agt   1444
Arg Thr Ile Asn Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser
            465             470                 475
```

```
      cag gag cct gtg ttg ttt gcc acc acg ata gct gaa aac att cgc tat    1492
      Gln Glu Pro Val Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr
  5                   480                 485                 490

      ggc cgc gaa aat gtc acc atg gat gag att gag aaa gct gtt aag gaa    1540
      Gly Arg Glu Asn Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu
                      495                 500                 505

 10   gcc aat gcc tat gat ttt atc atg aaa cta cct aat aaa ttt gac act    1588
      Ala Asn Ala Tyr Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr
                  510                 515                 520

      ctg gtt gga gag aga ggg gcc cag ctg agt ggt gga cag aaa cag aga    1636
 15   Leu Val Gly Glu Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg
      525                 530                 535                 540

      atc gcc att gct cgg gcc ctg gtt cgc aac ccc aag att ctt ctg ctg    1684
      Ile Ala Ile Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu
 20                   545                 550                 555

      gat gag gca acg tca gct ctg gac act gaa agt gaa gca gtg gtt cag    1732
      Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln
                      560                 565                 570
 25

      gtg gcc ctg gat aag gcc aga aaa ggc cgg act acc att gtg ata gct    1780
      Val Ala Leu Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala
                  575                 580                 585

 30   cat cgt ttg tct aca gtt cgt aat gcc gat gtc att gct ggt ttt gat    1828
      His Arg Leu Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp
                  590                 595                 600

      gat gga gtc att gtg gag aaa gga aat cat gat gaa ctc atg aaa gag    1876
 35   Asp Gly Val Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu
      605                 610                 615                 620

      aag ggc att tac ttc aaa ctt gtc aca atg cag aca aga gga aat gaa    1924
      Lys Gly Ile Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu
 40                   625                 630                 635

      att gag tta gaa aat gcc act ggt gaa tcc aaa agt gaa agt gat gcc    1972
      Ile Glu Leu Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala
                      640                 645                 650
 45

      ttg gaa atg tct cca aaa gat tca ggg tcc agt tta ata aaa aga aga    2020
      Leu Glu Met Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg
                  655                 660                 665

 50   tca act cgc agg agt ata cat gca cca caa ggc caa gac aga aag ctt    2068
      Ser Thr Arg Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu
                  670                 675                 680

      ggt aca aaa gag gac ttg aat gag aat gta cct cca gtt tcc ttc tgg    2116
 55   Gly Thr Lys Glu Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp
      685                 690                 695                 700

      agg att ctg aag ctg aac tca act gaa tgg cct tat ttt gtg gtt ggt    2164
      Arg Ile Leu Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly
 60                   705                 710                 715
```

```
ata ttt tgt gct att ata aac gga ggc ctg caa cca gca ttt tca ata     2212
Ile Phe Cys Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile
            720                 725                 730

ata ttt tca agg att ata ggg atc ttt acc cga gat gag gat cct gaa     2260
Ile Phe Ser Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu
            735                 740                 745

aca aaa cga cag aat agt aac atg ttt tct gta ttg ttt cta gtc ctt     2308
Thr Lys Arg Gln Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu
            750                 755                 760

gga att att tct ttt att aca ttt ttc ctc cag ggc ttc aca ttt ggc     2356
Gly Ile Ile Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly
765                 770                 775                 780

aaa gct ggg gag atc ctc act aag cgg ctt cga tac atg gtt ttc aga     2404
Lys Ala Gly Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg
                785                 790                 795

tcc atg ctg aga cag gat gtc agc tgg ttt gat gac cct aaa aac acc     2452
Ser Met Leu Arg Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr
                800                 805                 810

act gga gca ttg aca acc agg ctt gcc aat gat gcg gct caa gtt aaa     2500
Thr Gly Ala Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys
            815                 820                 825

ggg gct ata ggt tcc agg ctt gct gtc att acc cag aat ata gca aat     2548
Gly Ala Ile Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn
            830                 835                 840

ctt ggg aca ggc att att ata tcc tta atc tat ggt tgg caa tta aca     2596
Leu Gly Thr Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr
845                 850                 855                 860

ctt tta ctc tta gca att gta ccc atc att gca ata gca gga gtt gtt     2644
Leu Leu Leu Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val
                865                 870                 875

gaa atg aaa atg ttg tct gga caa gca ctg aaa gat aag aaa gag cta     2692
Glu Met Lys Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu
                880                 885                 890

gaa gga gct ggg aag att gct aca gaa gcc atc gaa aac ttc cga act     2740
Glu Gly Ala Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr
            895                 900                 905

gtt gtt tct ttg act cgg gag cag aag ttt gaa tac atg tat gca cag     2788
Val Val Ser Leu Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln
        910                 915                 920

agt ttg caa gta cca tac aga aac tct ttg agg aaa gca cac atc ttc     2836
Ser Leu Gln Val Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe
925                 930                 935                 940

ggg gtc tca ttt tct atc acc cag gca atg atg tat ttt tcc tat gct     2884
Gly Val Ser Phe Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala
            945                 950                 955
```

```
        ggc tgt ttc cgg ttt ggt gcc tac ttg gtg gca aat gag ttc atg aac    2932
        Gly Cys Phe Arg Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn
                    960             965                 970
  5

        ttt cag gat gtt ctt ttg gta ttc tca gct att gtc ttt ggt gcc atg    2980
        Phe Gln Asp Val Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met
                    975                 980                 985
 10
        gca gtg ggg cag gtc agt tca ttt gct cct gac tat gcc aaa gcc aaa    3028
        Ala Val Gly Gln Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys
                    990                 995             1000

        gta tca gca gcc cac gtc atc atg atc att gaa aaa agc cct ctg att    3076
 15     Val Ser Ala Ala His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile
        1005                1010                1015                1020

        gac agc tac agc cct cac ggc ctc aag cca aat acg ttg gaa gga aat    3124
        Asp Ser Tyr Ser Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn
 20                 1025                1030                1035

        gtg aca ttt aat gag gtc gtg ttc aac tat ccc act cga cca gac atc    3172
        Val Thr Phe Asn Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile
 25                 1040                1045                1050

        ccc gtg ctc cag ggg ctg agc ctc gag gtg aag aag ggc cag acg ctg    3220
        Pro Val Leu Gln Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu
                    1055                1060                1065

 30     gcc ctc gta ggt agc agt ggc tgt ggg aag agc aca gtt gtt cag ctc    3268
        Ala Leu Val Gly Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu
                    1070                1075                1080

        cta gag cgc ttc tat gac ccc ttg gct ggt tca gtg cta att gat ggc    3316
 35     Leu Glu Arg Phe Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly
        1085                1090                1095                1100

        aaa gag ata aag cac ctg aat gtc cag tgg ctc cga gca cac ctg ggc    3364
        Lys Glu Ile Lys His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly
 40                 1105                1110                1115

        atc gtg tct cag gag ccc atc ctg ttt gac tgc agc att gcc gag aac    3412
        Ile Val Ser Gln Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn
 45                 1120                1125                1130

        att gcc tat gga gac aac agc cgg gtc gta tca cat gaa gag att atg    3460
        Ile Ala Tyr Gly Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Met
                    1135                1140                1145

 50     cag gca gcc aag gag gcc aac ata cac cac ttc atc gag aca ctc cct    3508
        Gln Ala Ala Lys Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro
                    1150                1155                1160

        gag aaa tac aac acc aga gta gga gac aaa gga acc cag ctc tct ggt    3556
 55     Glu Lys Tyr Asn Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly
        1165                1170                1175                1180

        ggc cag aaa cag cgc att gcc ata gct cgc gct ctt gtt aga cag cct    3604
        Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro
 60                 1185                1190                1195
```

```
cat att ttg ctt ttg gat gaa gct aca tca gct ctg gat aca gaa agt    3652
His Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser
            1200                1205                1210

gaa aag gtt gtc caa gaa gcc ctg gac aaa gcc aga gaa ggc cgc acc    3700
Glu Lys Val Val Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr
            1215                1220                1225

tgc att gtg atc gcc cac cgc ttg tcc acc atc cag aat gca gat tta    3748
Cys Ile Val Ile Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu
            1230                1235                1240

ata gtg gtg ttt cag aat ggc aaa gtc aag gag cat ggc aca cat caa    3796
Ile Val Val Phe Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln
            1245                1250                1255            1260

cag ctg ctg gcc cag aaa ggc atc tat ttt tcc atg gtc agt gtc cag    3844
Gln Leu Leu Ala Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln
                1265                1270                1275

gct gga gca aag cgc tagtgaactg tggccatatg agctgttaaa tattttttaa    3899
Ala Gly Ala Lys Arg
                1280

tatttgtgtt aaaacatggc atttaatcaa agttaaaagg tgagcactta ctggaaaaac    3959
tatgtagaac tacctgttta acatttcttg ctgcaactga agatcattcc accaagttca    4019
gagtcttcag attttataat taaaggaacc aaaagaaaca ttatctgatg gaataaaata    4079
ctggtgttaa ttgcattata aaattataga gtaattcaaa gtagattttg ttaataaatt    4139
gtataatttt tgtttatatt ttatttgtaa cttactgctt tgctgaaaga ttatagaagt    4199
ggtaaaaagt actgaatgtt tgaataaagt gctagctata ataaaactaa actttatat    4259
caaaaaaaaa aaaaaaaaaa
```

```
        <210> 25
        <211> 1281
        <212> PRT
        <213> Canis familiaris

        <400> 25
Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu Lys Asn Phe Trp
1               5                   10                  15
Lys Met Gly Lys Lys Ser Lys Lys Lys Glu Lys Lys Glu Lys Lys Pro
            20                  25                  30
Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn Trp Leu Asp Arg
        35                  40                  45
Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile His Gly Ala Ala
    50                  55                  60
Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr Asp Ser Phe Ala
65                  70                  75                  80
Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val Ile Ile Asn Glu
                85                  90                  95
Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His Leu Glu Glu Glu
            100                 105                 110
Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu
        115                 120                 125
Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg
    130                 135                 140
Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln
145                 150                 155                 160
Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg
```

```
                            165                        170                            175
     Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Ile
                     180                        185                   190
 5   Gly Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr Gly Phe Ile Val
                 195                        200                   205
     Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser
         210                        215                   220
     Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys Ile Leu Ser Ser
     225                        230                   235                   240
10   Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala
                     245                   250                   255
     Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln
                 260                   265                   270
     Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Gly
15               275                   280                   285
     Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala
         290                   295                   300
     Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr
     305                   310                   315                   320
20   Ser Leu Val Leu Ser Ser Glu Tyr Ser Ile Gly Gln Val Leu Thr Val
                     325                   330                   335
     Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly Gln Ala Ser Pro
                 340                   345                   350
     Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe
25               355                   360                   365
     Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly
         370                   375                   380
     His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Lys Asn Val His
     385                   390                   395                   400
30   Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn
                     405                   410                   415
     Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly
                 420                   425                   430
     Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro
35               435                   440                   445
     Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile Arg Thr Ile Asn
         450                   455                   460
     Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser Gln Glu Pro Val
     465                   470                   475                   480
40   Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn
                     485                   490                   495
     Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr
                 500                   505                   510
     Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr Leu Val Gly Glu
45               515                   520                   525
     Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala
         530                   535                   540
     Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr
     545                   550                   555                   560
50   Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp
                     565                   570                   575
     Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser
                 580                   585                   590
     Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile
55               595                   600                   605
     Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr
                 610                   615                   620
     Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Glu Leu Glu
     625                   630                   635                   640
60   Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met Ser
```

```
                       645                        650                        655
     Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg Arg
                   660                    665                    670
     Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys Glu
 5               675                    680                    685
     Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp Arg Ile Leu Lys
                   690                    695                    700
     Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys Ala
     705                    710                    715                    720
10   Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser Arg
                       725                    730                    735
     Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg Gln
                   740                    745                    750
     Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile Ser
15               755                    760                    765
     Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu
                   770                    775                    780
     Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg
     785                    790                    795                    800
20   Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu
                       805                    810                    815
     Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly
                   820                    825                    830
     Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly
25               835                    840                    845
     Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu
                   850                    855                    860
     Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met
     865                    870                    875                    880
30   Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly
                       885                    890                    895
     Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu
                   900                    905                    910
     Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln Ser Leu Gln Val
35               915                    920                    925
     Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Val Ser Phe
                   930                    935                    940
     Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg
     945                    950                    955                    960
40   Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn Phe Gln Asp Val
                       965                    970                    975
     Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met Ala Val Gly Gln
                   980                    985                    990
     Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala
45               995                    1000                   1005
     His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile Asp Ser Tyr Ser
                   1010                   1015                   1020
     Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn
     1025                   1030                   1035                   1040
50   Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln
                       1045                   1050                   1055
     Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly
                   1060                   1065                   1070
     Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe
55               1075                   1080                   1085
     Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly Lys Glu Ile Lys
                   1090                   1095                   1100
     His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln
     1105                   1110                   1115                   1120
60   Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly
```

```
                    1125                  1130                  1135
      Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Met Gln Ala Ala Lys
                        1140                  1145              1150
  5   Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro Glu Lys Tyr Asn
                    1155                  1160              1165
      Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln
                1170                  1175              1180
      Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu
            1185                  1190              1195              1200
 10   Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val
                    1205                  1210              1215
      Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile
                1220                  1225              1230
      Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe
 15           1235                  1240              1245
      Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala
            1250                  1255              1260
      Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Ala Lys
        1265                  1270                  1275              1280
 20   Arg
```

```
              <210> 26
              <211> 4279
 25           <212> DNA
              <213> Canis familiaris

              <220>
              <221> CDS
 30           <222> (17)...(3859)

              <400> 26
      ggagcgcgag gtcggg atg gat cct gaa gga ggc cgt aag ggg agt gca gag      52
                        Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu
 35                      1                5                     10

      aag aac ttc tgg aaa atg ggc aaa aaa agt aaa aaa aaa gag aag aaa      100
      Lys Asn Phe Trp Lys Met Gly Lys Lys Ser Lys Lys Lys Glu Lys Lys
                15                  20                  25
 40
      gaa aag aaa cca act gtc agc acg ttt gca atg ttt cgc tat tca aat     148
      Glu Lys Lys Pro Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn
            30                  35                  40

 45   tgg ctt gat agg ttg tat atg ttg gtg ggg aca atg gct gcc atc atc     196
      Trp Leu Asp Arg Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile
      45                  50                  55                  60

      cat gga gct gca ctc cct ctc atg atg ctg gtt ttt gga aac atg aca     244
 50   His Gly Ala Ala Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr
                        65                  70                  75

      gat agc ttt gca aat gca gga att tca aga aac aaa act ttt cca gtt     292
      Asp Ser Phe Ala Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val
 55                 80                  85                  90

      ata att aat gaa agt att acg aac aat aca caa cat ttc atc aac cat     340
      Ile Ile Asn Glu Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His
                95                  100                 105
 60
```

```
ctg gag gag gaa atg acc acg tat gcc tat tat tac agt ggg atc ggt     388
Leu Glu Glu Glu Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly
110             115                 120

gct ggc gtg ctg gtg gct gct tac atc cag gtt tca ttc tgg tgc ctg     436
Ala Gly Val Leu Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu
125             130                 135                 140

gca gca gga aga cag ata ctc aaa att aga aaa caa ttt ttt cat gct     484
Ala Ala Gly Arg Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala
            145                 150                 155

atc atg cga cag gag att ggc tgg ttt gac gtg cat gac gtt ggg gag     532
Ile Met Arg Gln Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu
            160                 165                 170

ctt aac acc cgg ctc aca gac gat gtc tcc aaa atc aat gaa gga att     580
Leu Asn Thr Arg Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile
        175                 180                 185

ggc gac aaa att gga atg ttc ttt caa tca ata gca aca ttt ttc acc     628
Gly Asp Lys Ile Gly Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr
    190                 195                 200

ggt ttt ata gtg ggg ttt aca cgt ggt tgg aag cta acc ctt gtg att     676
Gly Phe Ile Val Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile
205             210                 215                 220

ttg gcc atc agc cct gtt ctt gga ctt tca gcc gcc atc tgg gca aag     724
Leu Ala Ile Ser Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys
            225                 230                 235

ata cta tct tca ttt act gat aaa gaa ctc ttg gcc tat gca aaa gct     772
Ile Leu Ser Ser Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala
            240                 245                 250

gga gca gta gct gaa gaa gtc tta gca gca atc aga act gtg att gcc     820
Gly Ala Val Ala Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala
            255                 260                 265

ttt gga gga caa aag aaa gaa ctt gaa agg tac aac aaa aat tta gaa     868
Phe Gly Gly Gln Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu
    270                 275                 280

gaa gct aaa gga att ggg ata aag aaa gct atc acg gcc aac att tct     916
Glu Ala Lys Gly Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser
285                 290                 295                 300

att ggt gcc gct ttc tta ttg atc tat gca tca tat gct ctg gct ttc     964
Ile Gly Ala Ala Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe
            305                 310                 315

tgg tat ggg acc tcc ttg gtc ctc tcc agt gaa tat act att gga caa     1012
Trp Tyr Gly Thr Ser Leu Val Leu Ser Ser Glu Tyr Thr Ile Gly Gln
            320                 325                 330

gta ctc act gtc ttc ttt tct gta tta att ggg gct ttt agt att gga     1060
Val Leu Thr Val Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly
            335                 340                 345
```

```
cag gca tcc cca agc att gaa gca ttt gca aac gca aga gga gca gct      1108
Gln Ala Ser Pro Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala
    350             355             360

tat gaa atc ttc aag ata att gac aat aaa cca agc att gac agc tat      1156
Tyr Glu Ile Phe Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr
365             370             375             380

tcg aag agt gga cat aaa cca gat aat att aag gga aat ttg gaa ttc      1204
Ser Lys Ser Gly His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe
            385             390             395

aaa aat gtt cac ttc agt tac cct tct cga aaa gaa gtt aag atc tta      1252
Lys Asn Val His Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu
            400             405             410

aag ggt ctc aac ctg aag gtt cag agt ggg cag aca gtg gcg ctg gtt      1300
Lys Gly Leu Asn Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val
        415             420             425

ggg aac agt ggc tgc ggg aag agc acg acc gtg cag ctg atg cag agg      1348
Gly Asn Ser Gly Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg
    430             435             440

ctc tat gac ccc aca gat ggc atg gtc tgt att gat gga cag gac att      1396
Leu Tyr Asp Pro Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile
445             450             455             460

agg acc ata aat gta agg cat ctt cgg gaa att act ggt gtg gtg agt      1444
Arg Thr Ile Asn Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser
            465             470             475

cag gag cct gtg ttg ttt gcc acc acg ata gct gaa aac att cgc tat      1492
Gln Glu Pro Val Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr
            480             485             490

ggc cgc gaa aat gtc acc atg gat gag att gag aaa gct gtt aag gaa      1540
Gly Arg Glu Asn Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu
        495             500             505

gcc aat gcc tat gat ttt atc atg aaa cta cct aat aaa ttt gac act      1588
Ala Asn Ala Tyr Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr
    510             515             520

ctg gtt gga gag aga ggg gcc cag ctg agt ggt gga cag aaa cag aga      1636
Leu Val Gly Glu Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg
525             530             535             540

atc gcc att gct cgg gcc ctg gtt cgc aac ccc aag att ctt ctg ctg      1684
Ile Ala Ile Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu
            545             550             555

gat gag gca acg tca gct ctg gac act gaa agt gaa gca gtg gtt cag      1732
Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln
            560             565             570

gtg gcc ctg gat aag gcc aga aaa ggc cgg act acc att gtg ata gct      1780
Val Ala Leu Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala
        575             580             585
```

```
cat cgt ttg tct aca gtt cgt aat gcc gat gtc att gct ggt ttt gat      1828
His Arg Leu Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp
    590             595             600

gat gga gtc att gtg gag aaa gga aat cat gat gaa ctc atg aaa gag      1876
Asp Gly Val Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu
605             610             615             620

aag ggc att tac ttc aaa ctt gtc aca atg cag aca aga gga aat gaa      1924
Lys Gly Ile Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu
            625             630             635

att gag tta gaa aat gcc act ggt gaa tcc aaa agt gaa agt gat gcc      1972
Ile Glu Leu Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala
            640             645             650

ttg gaa atg tct cca aaa gat tca ggg tcc agt tta ata aaa aga aga      2020
Leu Glu Met Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg
        655             660             665

tca act cgc agg agt ata cat gca cca caa ggc caa gac aga aag ctt      2068
Ser Thr Arg Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu
    670             675             680

ggt aca aaa gag gac ttg aat gag aat gta cct cca gtt tcc ttc tgg      2116
Gly Thr Lys Glu Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp
685             690             695             700

agg att ctg aag ctg aac tca act gaa tgg cct tat ttt gtg gtt ggt      2164
Arg Ile Leu Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly
            705             710             715

ata ttt tgt gct att ata aac gga ggc ctg caa cca gca ttt tca ata      2212
Ile Phe Cys Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile
            720             725             730

ata ttt tca agg att ata ggg atc ttt acc cga gat gag gat cct gaa      2260
Ile Phe Ser Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu
        735             740             745

aca aaa cga cag aat agt aac atg ttt tct gta ttg ttt cta gtc ctt      2308
Thr Lys Arg Gln Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu
    750             755             760

gga att att tct ttt att aca ttt ttc ctc cag ggc ttc aca ttt ggc      2356
Gly Ile Ile Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly
765             770             775             780

aaa gct ggg gag atc ctc act aag cgg ctt cga tac atg gtt ttc aga      2404
Lys Ala Gly Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg
            785             790             795

tcc atg ctg aga cag gat gtc agc tgg ttt gat gac cct aaa aac acc      2452
Ser Met Leu Arg Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr
            800             805             810

act gga gca ttg aca acc agg ctt gcc aat gat gcg gct caa gtt aaa      2500
Thr Gly Ala Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys
        815             820             825
```

```
ggg gct ata ggt tcc agg ctt gct gtc att acc cag aat ata gca aat      2548
Gly Ala Ile Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn
    830                 835             840

ctt ggg aca ggc att att ata tcc tta atc tat ggt tgg caa tta aca      2596
Leu Gly Thr Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr
845                 850                 855                 860

ctt tta ctc tta gca att gta ccc atc att gca ata gca gga gtt gtt      2644
Leu Leu Leu Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val
            865                 870                 875

gaa atg aaa atg ttg tct gga caa gca ctg aaa gat aag aaa gag cta      2692
Glu Met Lys Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu
        880                 885                 890

gaa gga gct ggg aag att gct aca gaa gcc atc gaa aac ttc cga act      2740
Glu Gly Ala Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr
        895                 900                 905

gtt gtt tct ttg act cgg gag cag aag ttt gaa tac atg tat gca cag      2788
Val Val Ser Leu Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln
        910                 915                 920

agt ttg caa gta cca tac aga aac tct ttg agg aaa gca cac atc ttc      2836
Ser Leu Gln Val Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe
925                 930                 935                 940

ggg gtc tca ttt tct atc acc cag gca atg atg tat ttt tcc tat gct      2884
Gly Val Ser Phe Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala
            945                 950                 955

ggc tgt ttc cgg ttt ggt gcc tac ttg gtg gca aat gag ttc atg aac      2932
Gly Cys Phe Arg Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn
        960                 965                 970

ttt cag gat gtt ctt ttg gta ttc tca gct att gtc ttt ggt gcc atg      2980
Phe Gln Asp Val Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met
        975                 980                 985

gca gtg ggg cag gtc agt tca ttt gct cct gac tat gcc aaa gcc aaa      3028
Ala Val Gly Gln Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys
        990                 995                 1000

gta tca gca gcc cac gtc atc atg atc att gaa aaa agc cct ctg att      3076
Val Ser Ala Ala His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile
1005                 1010                1015                1020

gac agc tac agc cct cac ggc ctc aag cca aat acg ttg gaa gga aat      3124
Asp Ser Tyr Ser Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn
            1025                1030                1035

gtg aca ttt aat gag gtc gtg ttc aac tat ccc act cga cca gac atc      3172
Val Thr Phe Asn Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile
            1040                1045                1050

ccc gtg ctc cag ggg ctg agc ctc gag gtg aag aag ggc cag acg ctg      3220
Pro Val Leu Gln Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu
            1055                1060                1065
```

```
     gcc ctc gta ggt agc agt ggc tgt ggg aag agc aca gtt gtt cag ctc        3268
     Ala Leu Val Gly Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu
         1070                1075                1080
```

```
 5   cta gag cgc ttc tat gac ccc ttg gct ggt tca gtg cta att gat ggc        3316
     Leu Glu Arg Phe Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly
         1085                1090                1095                1100
```

```
10   aaa gag ata aag cac ctg aat gtc cag tgg ctc cga gca cac ctg ggc        3364
     Lys Glu Ile Lys His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly
         1105                1110                1115
```

```
     atc gtg tct cag gag ccc atc ctg ttt gac tgc agc att gcc gag aac        3412
     Ile Val Ser Gln Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn
15       1120                1125                1130
```

```
     att gcc tat gga gac aac agc cgg gtc gta tca cat gaa gag att gtg        3460
     Ile Ala Tyr Gly Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Val
         1135                1140                1145
20
```

```
     cag gca gcc aag gag gcc aac ata cac cac ttc atc gag aca ctc cct        3508
     Gln Ala Ala Lys Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro
         1150                1155                1160
```

```
25   gag aaa tac aac acc aga gta gga gac aaa gga acc cag ctc tct ggt        3556
     Glu Lys Tyr Asn Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly
         1165                1170                1175                1180
```

```
30   ggc cag aaa cag cgc att gcc ata gct cgc gct ctt gtt aga cag cct        3604
     Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro
         1185                1190                1195
```

```
     cat att ttg ctt ttg gat gaa gct aca tca gct ctg gat aca gaa agt        3652
     His Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser
35       1200                1205                1210
```

```
     gaa aag gtt gtc caa gaa gcc ctg gac aaa gcc aga gaa ggc cgc acc        3700
     Glu Lys Val Val Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr
         1215                1220                1225
40
```

```
     tgc att gtg atc gcc cac cgc ttg tcc acc atc cag aat gca gat tta        3748
     Cys Ile Val Ile Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu
         1230                1235                1240
```

```
45   ata gtg gtg ttt cag aat ggc aaa gtc aag gag cat ggc aca cat caa        3796
     Ile Val Val Phe Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln
         1245                1250                1255                1260
```

```
50   cag ctg ctg gcc cag aaa ggc atc tat ttt tcc atg gtc agt gtc cag        3844
     Gln Leu Leu Ala Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln
         1265                1270                1275
```

```
     gct gga gca aag cgc tagtgaactg tggccatatg agctgttaaa tatttttaa        3899
     Ala Gly Ala Lys Arg
         1280
55
```

```
     tatttgtgtt aaaacatggc atttaatcaa agttaaaagg tgagcactta ctggaaaaac      3959
     tatgtagaac tacctgttta acatttcttg ctgcaactga agatcattcc accaagttca      4019
     gagtcttcag attttataat taaaggaacc aaaagaaaca ttatctgatg gaataaaata      4079
60   ctggtgttaa ttgcattata aaattataga gtaattcaaa gtagattttg ttaataaatt      4139
```

```
gtataatttt tgtttatatt ttatttgtaa cttactgctt tgctgaaaga ttatagaagt    4199
ggtaaaaagt actgaatgtt tgaataaagt gctagctata ataaaactaa actttttatat  4259
caaaaaaaaa aaaaaaaaaa
```

<210> 27
<211> 1281
<212> PRT
<213> Canis familiaris

<400> 27

```
Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu Lys Asn Phe Trp
1               5                   10                  15
Lys Met Gly Lys Lys Ser Lys Lys Lys Glu Lys Lys Glu Lys Lys Pro
            20                  25                  30
Thr Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn Trp Leu Asp Arg
        35                  40                  45
Leu Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile His Gly Ala Ala
    50                  55                  60
Leu Pro Leu Met Met Leu Val Phe Gly Asn Met Thr Asp Ser Phe Ala
65                  70                  75                  80
Asn Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val Ile Ile Asn Glu
                85                  90                  95
Ser Ile Thr Asn Asn Thr Gln His Phe Ile Asn His Leu Glu Glu Glu
            100                 105                 110
Met Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu
        115                 120                 125
Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg
    130                 135                 140
Gln Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln
145                 150                 155                 160
Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg
                165                 170                 175
Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Ile
            180                 185                 190
Gly Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr Gly Phe Ile Val
        195                 200                 205
Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser
    210                 215                 220
Pro Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys Ile Leu Ser Ser
225                 230                 235                 240
Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala
                245                 250                 255
Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln
            260                 265                 270
Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Gly
    275                 280                 285
Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala
    290                 295                 300
Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr
305                 310                 315                 320
Ser Leu Val Leu Ser Ser Glu Tyr Thr Ile Gly Gln Val Leu Thr Val
                325                 330                 335
Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly Gln Ala Ser Pro
            340                 345                 350
Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe
    355                 360                 365
Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly
370                 375                 380
His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Lys Asn Val His
385                 390                 395                 400
```

```
      Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn
                      405                 410             415
      Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly
                      420                 425             430
 5    Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro
                      435                 440             445
      Thr Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile Arg Thr Ile Asn
                  450                 455             460
      Val Arg His Leu Arg Glu Ile Thr Gly Val Val Ser Gln Glu Pro Val
 10   465                 470                 475             480
      Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn
                      485                 490             495
      Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr
                  500                 505             510
 15   Asp Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr Leu Val Gly Glu
                  515                 520             525
      Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala
          530                 535             540
      Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr
 20   545                 550             555             560
      Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp
                  565             570             575
      Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser
                  580             585             590
 25   Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile
              595             600             605
      Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr
          610             615             620
      Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Glu Leu Glu
 30   625             630             635             640
      Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met Ser
                  645             650             655
      Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg Arg
                  660             665             670
 35   Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys Glu
                  675             680             685
      Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp Arg Ile Leu Lys
          690             695             700
      Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys Ala
 40   705             710             715             720
      Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser Arg
                  725             730             735
      Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg Gln
                  740             745             750
 45   Asn Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile Ser
              755             760             765
      Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu
          770             775             780
      Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg
 50   785             790             795             800
      Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu
                  805             810             815
      Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly
                  820             825             830
 55   Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly
              835             840             845
      Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu
          850             855             860
      Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met
 60   865             870             875             880
```

```
Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly
                885                 890                 895
Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu
            900                 905                 910
Thr Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln Ser Leu Gln Val
        915                 920                 925
Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Val Ser Phe
    930                 935                 940
Ser Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg
945                 950                 955                 960
Phe Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn Phe Gln Asp Val
                965                 970                 975
Leu Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met Ala Val Gly Gln
                980                 985                 990
Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala
        995                 1000                1005
His Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile Asp Ser Tyr Ser
    1010                1015                1020
Pro His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn
    1025                1030                1035                1040
Glu Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln
                1045                1050                1055
Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly
                1060                1065                1070
Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe
        1075                1080                1085
Tyr Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly Lys Glu Ile Lys
        1090                1095                1100
His Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln
1105                1110                1115                1120
Glu Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly
                1125                1130                1135
Asp Asn Ser Arg Val Val Ser His Glu Glu Ile Val Gln Ala Ala Lys
            1140                1145                1150
Glu Ala Asn Ile His His Phe Ile Glu Thr Leu Pro Glu Lys Tyr Asn
        1155                1160                1165
Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln
    1170                1175                1180
Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu
1185                1190                1195                1200
Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val
                1205                1210                1215
Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile
            1220                1225                1230
Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe
        1235                1240                1245
Gln Asn Gly Lys Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala
    1250                1255                1260
Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Ala Lys
1265                1270                1275                1280
Arg
```

```
<210> 28
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide
```

<400> 28
nnttttttttt tttttttttt ttttttttttt ttcgccggcg acttaagatc tt   52

<210> 29
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 29
ccatcctaat acgactcact gtagggc   27

<210> 30
<211> 34
<212> DNA
<213> Canis familiaris

<400> 30
gcaaatgctt caatgcttgg ggatgcctgt ccaa   34

<210> 31
<211> 33
<212> DNA
<213> Canis familiaris

<400> 31
gagctgggtt cctttgtctc ctactctggt gtt   33

<210> 32
<211> 23
<212> DNA
<213> Canis familiaris

<400> 32
gcaaatgctg gttgcaggcc tcc   23